NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

New repository anchors distributed nets

By John Cox
Washington, D.C.

Corporate data managers at Platinum Technology, Inc.'s user conference here this week will get a sneak preview of the company's next-generation informa-

tion repository, company officials confirmed.

The new client/server repository, which has been in limited release since Aug. 15, is the first fruit of a crash development effort as intensive as it is ambi-

tious. The still-unannounced product is designed to be used as the collection point for every scrap of corporate metadata. This information describes the data, business rules and processes held in host or server databases, applications, computer-aided software engineering (CASE) models and so on.

Metadata will enable MIS to develop, deploy and, most of all, manage fast-growing distributed computing environments.

"We want to be the home of all metadata in the enterprise,"
See Repository, page 88

Cable firms creep toward rollout of local-loop service

By Tim Greene

David Heiser has been living a connectivity dream come true.

Since April, his home LAN — connecting a PC and a Unix workstation — has been linked at LAN speeds to his office network at Network MCI Services over the local cable TV system.

At 10M bit/sec, Heiser feels like he is sitting on the office LAN, and he loves it. "If they take it away, I'll quit and become a dessert cook," he said.

The service is part of a tele-

Teleport's *Catherine Mason is testing telephony over a cable TV network in Arlington Heights, Ill.*

ALAN KLEIR

commuting experiment involving MCI Communications Corp., Colorado Springs Cablevision, Inc. and Digital Equipment
See Cable, page 16

NOVELL SPOTLIGHT

Pervasive Frankenberg

Robert Frankenberg hit the ground running when he took the reins at Novell last year and hasn't stopped since. Reminiscent of J.F.K.'s lofty goal of putting a man on the moon in the '60s, Frankenberg wants to see his strategy of Pervasive Computing result in a universal network linking one billion devices by the year 2000.

This is no hollow marketing pitch. Frankenberg has assembled a top-notch team of lieutenants to rally the troops. They say technologies such as NEST, GroupWise and NetWare Directory Services will help show the way. So will NetWare 4.1 — which, as the first in our series of NOS tests shows, represents a giant step into the enterprise for Novell. But you be the judge.

Novell Special Section begins on page 54.

Sprint hooks up with EDS on monster frame relay net

By David Rohde
Charlotte, N.C.

Sprint Corp. and EDS Corp. are in the process of building the world's largest frame relay network.
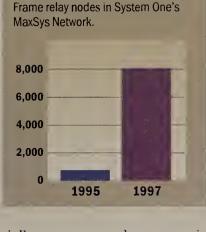
The nearly 8,000-node airline reservations system network, dubbed the MaxSys Network, will link System One Corp.'s data center here with travel agents around the country, speeding response times and paving the way for new bandwidth-hungry applications.

About 170 nodes are up and running, with a schedule to have a total of 765 up by the end of the year, said System One's Eddie Tie, project manager for the MaxSys Network. The rest of the network will be built out over the next two years, ultimately replacing analog private lines from AT&T and local exchange carriers, he said.

To ship frames into the network, travel agencies are being outfitted with MonoFRAD or QuadFRAD frame relay access devices from FastComm Communications Corp. based in Sterling, Va.

System One picked Fast-Comm over several contenders for the giant contract. But it was EDS — which operates System One facilities and is a part-owner of the reservations net — that was responsible for choosing Sprint over competing carriers.

Although EDS would not offi-

NODAL EXPLOSION
Frame relay nodes in System One's MaxSys Network.

8,000	
6,000	
4,000	
2,000	
0	
1995	**1997**
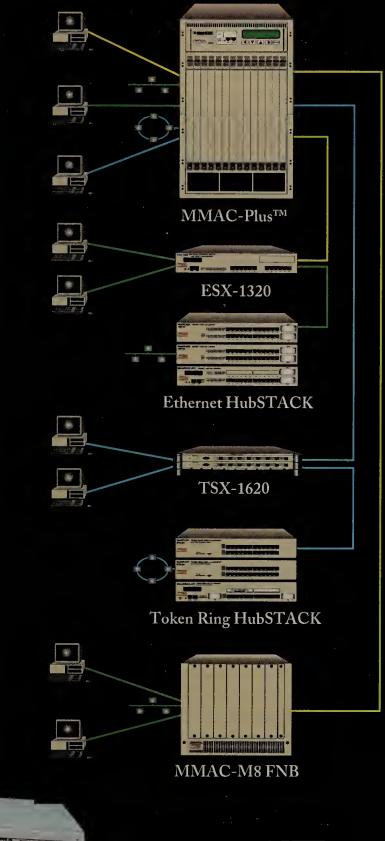
cially comment on the reasons, it appears that EDS preferred Sprint's frame relay congestion management scheme over AT&T's. Sprint's Alcatel Data Network switches use a congestion control mechanism that allows frames to be dropped as they pass through the frame re-
See Frame relay, page 86

Two faces of ATM

The good news: IBM readies a new global ATM service.

By Michael Cooney

IBM later this year will do an end run around traditional carriers when it launches a public ATM service on its Global Network infrastructure.

Sources said IBM is readying a raft of ATM-based services — including multiprotocol routing, virtual LAN support, frame relay access and mixed voice/data capabilities — for delivery
See IBM, page 88

The bad news: Application woes revealed in ATM trial.

By Joanie Wexler
Dallas

Six weeks into an ATM tire-kicking exercise by Perot Systems Corp., two key problems have already leaked out — today's applications do not use high-speed switching efficiently and end-to-end ATM service is far from plug and play.
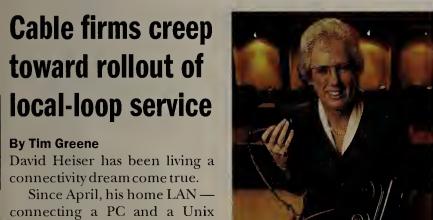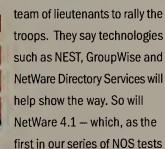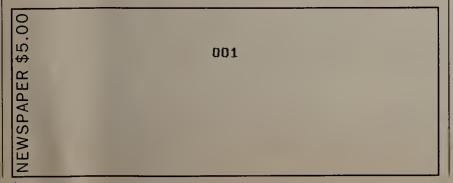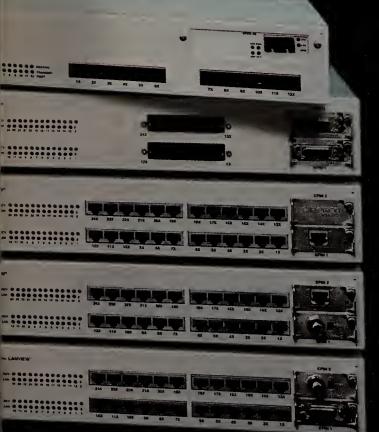
Perot discovered during a multivendor imaging and video-conferencing trial, slated to last another six months, that IP flow-control schemes can't keep up with high-speed Asynchronous Transfer Mode nets.

The company also needed to tweak routing software and work around shortcomings in carrier connectivity to get its ATM applications running, said Gabe Long, Perot's lead engineer on the project.

On the positive side, the medical imaging test application "looks darn good" over 45M bit/sec ATM links, said Phil Evans, Perot's director of telecommunications. "You get a high-fidelity image so that when they apply the scalpel, they're cutting where they should be."

Perot is also happy with the ATM Forum's User-Network Interface (UNI), which defines interaction between desktop equipment and ATM-ready routers, and between routers and the WAN. Long said it "works like a charm," without any revision, though he cautioned that identical UNI software must run at both ends of a link.

Perot launched the trial —
See Perot, page 10

Briefs, September 11, 1995

Get it in writing

■ Novell, Inc. has given Microsoft Corp. special written permission to run its Windows NT client for NetWare, exempting Microsoft from Novell's new product license that prohibits developers of competing software to use the product. The exemption enables Microsoft to better trouble-shoot and provide support for its customers who also run Novell's client. "This appears to permit us to do what we need to support users," said Robert Kruger, Microsoft's director of technology market-ing. Value-added resellers and system integrators who beta-test for Microsoft may be violating Novell's license because they could be construed as helping a Novell competitor develop products (*NW*, July 24, page 1).

The FCC takes a body blow

■ A recent preemptive move by Reed Hundt, chairman of the Federal Communications Com-mission, to cut personnel by 10% and close some field offices (*NW*, Aug. 28, page 22) appears to have backfired.

Last week, a Senate appropriations subcommit-tee voted to slash the FCC's budget 20% below cur-rent levels and nearly 34% below Hundt's request for next year. Hundt protested that such cuts would "make it impossible for us to perform the duties Congress has delegated to us, and leave consumers exposed to crimes and frauds on the information highway that we will be able to do nothing about."

UUNET goes T-3

■ Internet provider UUNET Technologies, Inc. will announce that it is offering T-3 Internet access over leased lines to 13 points of presence nation-wide as of this month and that it will expand that number to 27 sites next month. Fairfax, Va.-based UUNET is also offering frame relay access in 3M bit/sec increments, priced at $5,000 per month, on up to T-3 speed, priced at $49,000 a month. In addition, the company will provide 34M bit/sec dial-up Switched Multimegabit Data Service access at $1,500 per month.

Bay wields Lightsabre

■ Bay Networks, Inc. this week will flesh out its plan to add Asynchro-nous Transfer Mode switching to its Lattis System 5000 hub as part of the company's Lightsabre pro-ject (*NW*, April 10, page 1). The company is also expected to discuss the addition of virtual network routing capabilities to the intelligent hub, all in an effort to make the 5000 a scalable wiring closet and backbone switch.

Bay Networks

Cisco seeks remote control

■ Cisco Systems, Inc. this week will make yet another remote access product announcement with the introduction of a new mid-range router and enhancements to the company's 1000 series devices. The new router, called the 4700, is an upgrade of Cisco's 4500 platform, analysts and product testers said. Cisco confirmed that the 4700 will be announced but declined to provide details.

Service from another planet

■ AT&T plans this week to deliver the first fruits of its Internet services partnership with BBN Planet Corp., which was announced last month. The car-rier will roll out dedicated managed Internet access services at a press event in New York.

Contents

Fore Systems CEO Eric Cooper (left) and StrataCom President Dick Moley *see matu-ration of ATM as an imminent occurrence. Page 19.*

MANAGEMENT STRATEGIES

You can get qualified help quickly by applying project manage-ment techniques to the hiring process. Page 67.

HELP WANTED

Manager of twenty pe
Two to five years exper
Willingness to travel ar
Previous experience de

Assistant to the pr...

Visual Basic 4.0 packs apps punch

By John Cox
Redmond, Wash.

After tomorrow, using Microsoft Corp.'s Visual Basic to build a distributed application will no longer be an unnatural act.

The firm will formally announce, at special Developers Days events worldwide, the availability of Visual Basic 4.0, a 32-bit version of the widely used Windows development tool. Intended for building applications on Windows 95 and Windows NT, Visual Basic 4.0 is the first version to provide easy access to networked databases and server-based application logic.

"It represents a pretty fundamental step forward," said Steve Harshbarger, a director with Micro Modeling Associates, Inc., a developer of custom business applications and a Visual Basic 4.0 beta site. "It gives us a whole new option in how to architect applications."

That option is made possible by the tool set's extensive support for Microsoft's OLE technology. OLE specifies how software components, called objects, interact with each other in a Microsoft environment.

Visual Basic developers now can incorporate in their applications OLE Controls (OCX), which are reusable, on-screen components in graphical applications. And they can build and control OLE Servers, which encapsulate business rules, such as a tax rule. "OLE is absolutely all over this product," said Jon *See Visual Basic, page 87*

VISUAL BASIC 4.0 ARRIVES

The software uses OLE-wrapped remote procedure calls (RPC) to execute remote objects.

1. Open list of remote OLE objects.

2. Select object.

3. Fill in fields.

4. The software executes an RPC to a remote object.

LANshark poised to attack the Banyan VINES customer base

By Kevin Fogarty
Reynoldsburg, Ohio

LANshark Systems, Inc. and Toucan Software, Inc. are looking to bite into Banyan Systems, Inc.'s customer base with products that will hook Windows NT servers tightly with VINES networks.

LANshark's CD-Direct 3.0 and Toucan's StreetDrive sit on top of a Windows NT server and make it look just like a VINES file server to Banyan clients.

Toucan's new StreetPrint also lets Banyan clients print through Windows NT.

The products, which will ship this month, are designed to replace the file service in VINES with Windows NT, reducing or eliminating the need for Banyan's Enterprise Network Ser-

vices (ENS) for NT, due later this year. Current ENS products layer VINES services, such as messaging and directory on Unix, but use the file services of the host network operating system.

LANshark's multithreaded, 32-bit application gives Banyan clients full access to files stored on Windows NT servers. It also includes administration tools that limit the amount of disk space a user gets, meter DOS or Windows 95 applications being run from the NT server and take advantage of NT services, such as the ability to maintain a log of users who have accessed a file.

Because Windows NT also allows NetWare, Windows for Workgroups, LAN Manager, *See LANshark, page 86*

Sybase keys in on messaging

By Barb Cole
Emeryville, Calif.

Sybase, Inc. plans to make it easier for users to distribute and access its SQL Server databases as well as non-Sybase data over wired and wireless networks, company officials said last week.

At the core of the plan is the inclusion of messaging capabilities in Sybase's database gateways and replication software. The company will also extend its replication offering to support several additional mainframe data sources.

By the end of 1996, the company will ship versions of its OmniConnect database gateways as well as its Replication Server that support Sybase's Enterprise Messaging Service (EMS), a store-and-forward middleware technology that lets applications and servers communicate over wired and wireless

networks, said Merv Adrian, principal market analyst at Sybase. The messaging software was developed by Complex Architectures, Inc., which Sybase acquired last February.

The integration effort follows up on plans announced by Sybase last May to build EMS into the company's Open Client and Open Server APIs, which will enable applications that utilize those APIs to communicate via EMS.

Adding messaging capabilities to the gateways and Replication Server means that users will be able to do heterogeneous replication and access multiple data sources over a messaging backbone, Adrian said.

"The goal is to enable users to build applications that don't care whether you transmit [data] over wireless or wired networks," he said.

Betsy Burton, an analyst at Gartner Group, Inc. in Santa Clara, Calif., said, "Messaging will result in a real shift in the way databases handle transactions because it is an asynchronous process and databases aren't."
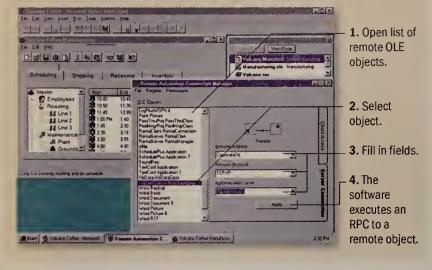
CONNECTIVITY AND REPLICATION REVISIONS

▶ Sybase will enhance its Replication Server and OmniConnect gateways to work over the company's messaging architecture.

▶ The firm will add DCE naming and security support to its gateways.

▶ Replication Server will gain support for IMS, VSAM and ADABAS.

With a traditional database transaction, users must stay connected via the network until the results of a query are returned. In a messaging environment, a *See Sybase, page 87*

Sync Research takes its corner in the stackable FRAD ring

By Michael Cooney
Irvine, Calif.

Sync Research this week will roll out a stackable frame relay access device (FRAD) that will help users better handle burgeoning branch office networking requirements.

The new, scalable Frame-Node 4200 lets users more effectively consolidate branch office SNA and LAN traffic over frame relay links by mixing the company's existing SNA and LAN traffic prioritization and congestion control features with a new stackable platform.

"Many SNA/LAN-based branch offices need more connectivity than they get with fixed chassis FRADs, so we are providing a way for users to support hundreds of serial ports and many LANs from a single location," said Todd Krautkramer, vice president of marketing at Sync.

The Intel Corp. 80486-based 4200 comes with a single token ring-to-Ethernet LAN port and eight WAN ports that can support speeds up to 2.048M bit/sec each. Smaller versions of the 4200 are also in development, he said. The device sits in the remote branch office and can feed data to an upstream router, front-end processor or concentrate data to another 4200.

As many as 100 4200s can be stacked together. The stack is controlled by new software based

on the firm's new OpenStack architecture. With the OpenStack architecture, users can distribute 4200s across a campus or building and concentrate them to a single 4200, which would access a frame relay service.

The box also helps guarantee delivery of SNA data by deploying adaptive pacing and burst-rate control technology to keep mission-critical SNA or other connection-oriented data from exceeding their committed information rate and consequently being discarded.

The FrameNode 4200 will be available in October for prices ranging from $5,995 to $7,595. ©Sync: (714) 588-2070.

Exchange is no Notes killer, report states

By Annmarie Timmins
Boston

The initial version of Microsoft Corp.'s Exchange messaging product that is expected to ship around year-end is no cause for Lotus Development Corp.'s Notes team to panic, according to a report issued last week.

Exchange and Notes 4, also due around year-end, are equals when it comes to electronic mail and groupware, according to David Marshak, a senior consultant with Patricia Seybold Group, Inc., based here, and the author of two Notes-related publications. But otherwise, it is more fair to match up Exchange against an early release of Notes, he said.

"Looking strictly at advanced functionality," Marshak said, "the case for Exchange is very weak, and it gets weaker as you

move up the scale."

Notes is particularly strong in interenterprise applications, electronic commerce, workflow and support for mobile users, Marshak said. Exchange is either not a player in those areas or has minimal capabilities, the report says (see graphic, page 87).

Marshak warned that his report, titled "Lotus Notes vs. Microsoft Exchange," examines products that have not shipped yet, leaving some things unknown.

The report looks at the first beta release of Notes 4 and the second beta of Exchange.

Marshak predicted that users who have not committed to either camp and are waiting to see Exchange will choose Notes. "Exchange won't meet their needs," he said.

Exchange will not be without advantages over Notes when it starts shipping, however. Notes offers nothing to compete with Microsoft's group calendar product, Schedule+, Marshak said. Users will have to wait until IBM integrates Lotus' calendar *See Exchange, page 87*

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Circle Reader Service #61

RBOC plunges into data backup

By David Rohde
Eatontown, N.J.

Seizing what could be a golden opportunity to put more minutes on the public net, a regional Bell operating company is planning to next year leap into the LAN backup business.

In January, SBC Communications, Inc. will introduce in the Houston area an offering known for now as PC Backup and Recovery Service, with full service rollout scheduled for the rest of SBC's five-state territory during 1996 and 1997.

The service, which would let firms automatically back up servers and PCs to net data vaults on a set schedule, could help network managers safeguard data at remote branch offices and small company sites.

"You're going to be seeing a lot more of this," said Paul Penrod, president of Penrod Engineering, a Portland, Ore., consultancy specializing in data backup and recovery issues. Telephone companies can provision parallel circuits to scale up needs as required.

According to documents filed with the Federal Communications Commission, under the SBC service, the company will install backup software on standalone PCs or servers and take an initial backup using a laptop or portable disk drive.

Daily or weekly incremental backups are then initiated by the software, which dials a data archive system at a central office and logs on via an automated script. The data is compressed and optionally encrypted, transmitted over analog or ISDN phone lines and stored on redundant tape libraries in two different buildings.

FCC approval for the SBC service — required because it is considered an RBOC-enhanced communications service triggering regulatory protections — is expected around November.

AT&T vault

Fellow carrier AT&T also plans to launch some backup news in January. Little-known AT&T CommVault Systems, which has been building net storage management systems for the telephone industry for years, now plans to start hawking the products to enterprise users.

AT&T Backup, a system for installation on the customer premise, consists of software on a Unix storage server that transfers data to a jukebox containing optical platters, each holding at least 1.3G bytes of data.

Backup plan

AT&T Backup lets users back up data from and restore data to multiple NetWare servers from a central storage server as well as support Digital VMS and Unix environments.
GRAPHIC BY SUSAN J. CHAMPENY

The largest platters, measuring 12 inches in diameter, can hold 6.5G bytes of data in write-once, read-many times format. All told, the jukebox scales from 20G bytes to 1 terabyte of data.

CommVault is a division of equipment maker AT&T Network Systems, which primarily sells switching systems to phone companies. "We're probably the best-kept secret in the industry," said Dave Ballard, a systems engineer at AT&T CommVault headquarters here.

A network administrator can either buy multiple AT&T Backup systems to support individual building or campus LANs, or buy a single central-site system that supports remote sites via high-speed data links.

Over time, AT&T Backup has grown to support NetWare LANs and Digital Equipment Corp. VMS environments, as well as Unix-based systems (see graphic), though direct file access by end users or administrators must be initiated using standard Unix commands. A separate product, AT&T CommVault for Banyan, supports VINES servers.

The firm has already sold some systems to corporations, particularly in the financial arena, with 14 systems installed at Salomon Brothers, Inc. ∎

Bay Networks buys Xylogics

By Jim Duffy
Santa Clara, Calif.

Bay Networks, Inc. last week moved to fill a major gap in its product portfolio by acquiring remote access vendor Xylogics, Inc. for about $330 million in stock.

The deal gives Bay Networks an instant share of the market for devices that connect remote users to corporate nets via analog and digital dial-up lines, including ISDN connections. Xylogics was second to Shiva Corp. in the number of remote access server ports shipped in 1994, said market tracker In-Stat, Inc. of Scottsdale, Ariz. (see graphic, page 87).

In addition to grabbing 21% of the remote access server market, Bay Networks also fills a yawning chasm in its internetworking product line.

Rival Cisco Systems, Inc. has been snapping up companies, such as Combinet, Inc. and Newport Systems Solutions, Inc., and forging alliances with U.S. Robotics, Inc. and Livingston Enterprises, Inc. Until now, Bay Networks has been standing idly by, offering only its Access Node and Access Stack Node routers for branch office connectivity requirements.

According to analysts, Bay Networks still has a ways to go

Cisco continues remote access assault

Cisco Systems, Inc. is expected to soon fortify its remote access arsenal with a central-site concentration device based on a variant of its 7000 router and targeted at Ascend Communications, Inc.'s Max platform.

The Cisco offering is designed for companies, including Internet service providers, looking to provide network access to multiple remote users.

The device, referred to by analysts as the "Max-killer," is a modular chassis capable of supporting modem and ISDN cards from multiple vendors, sources said. But specifics on the architecture, configuration options and price were not available.

Paul Johnson, an analyst at brokerage firm Robertson Stephens & Co. in New York, said the remote access product is based on the Cisco 7000 platform. And Todd Dagres, an analyst at Montgomery Securities, Inc. in San Francisco, said the system will support routing as well as dial-up analog and digital connections, including Primary Rate Interface ISDN, channelized T-1/E-1 leased circuits and inverse multiplexing for voice, data and video applications.

A Cisco spokesman declined comment but said to "stay tuned" for a mid-range and low-end remote access announcement that could come this week.

Ascend's Max, meanwhile, supports as many as 96 remote users dialing in to a central-site LAN using modems or dial-up digital lines. It features six slots, sports a direct Ethernet connection, adheres to BONDING and Multichannel PPP inverse muxing specifications, routes IP and IPX traffic, and supports frame relay services.

The Max also features integrated V.32bis, 14.4K bit/sec, V.34, V.42 and V.42bis modems. In a base configuration, Ascend's offering supports four ISDN PRIs and costs about $18,500.

"We've been hearing [about] this [Cisco device] for a long time," said Jay Duncanson, an Ascend cofounder. "Ascend is also building a Max-killer. We're not sitting still."

Tool helps assess costs and benefits of Win95 upgrade

By Peggy Watt
San Diego

Network managers assessing the cost of implementing Windows 95 can get help from a new spreadsheet-based auditing tool from Horizons Technology, Inc.

Moving to the new Microsoft Corp. operating system is not cut-and-dried. Companies often must upgrade or replace equipment — from CPUs to hard disks and peripherals — or incompatible applications to run the hardware-hungry Windows 95.

In addition, users are already experiencing the unanticipated and sometimes high costs of deployment, support and training.

The Windows 95 Reality Check Toolkit is a financial modeling worksheet that runs with Microsoft's Excel 5.0 and Horizons Technology's LANauditor network inventory software. It draws data from a LANauditor inventory to identify equipment needs and groups users by department or other categories. Managers can then run what-if scenarios to figure out costs and advantages.

For example, Horizons Technology used Reality Check to determine that it would cost $1.5 million to upgrade the company's 450 PCs with hardware and software enhancements to run Windows 95.

"The No. 1 challenge with Windows 95 is helping an organization recognize the process" of implementing Windows 95, according to Bill Holder, director of operations for Micropath, Inc. of Bellevue, Wash., a consulting firm that specializes in corporate inventories and asset management.

"A corporation needs to run an inventory collection tool, then sort out the specs and put cost figures to that," Holder said.

"Horizons Technology built that right into the product," he added.

Moving to the new Microsoft Corp. operating system is not cut-and-dry, as companies often must upgrade equipment or software.

For example, a manager may assume initial high demand and cost for the help desk that supports Windows 95 but gain long-term savings as users learn the new software.

"If you reduce support costs, your savings may justify the cost of upgrading hardware," said Ryc Brownrigg, senior product manager for Horizons Technology's net products.

But if a company's custom mission-critical application will not run on Windows 95, upgrading may prove too costly.

LANauditor runs on all major networks and supports agents for a variety of nodes, including DOS, Windows 3.X, Windows NT, IBM OS/2 and Apple Computer, Inc. Macintosh.

Reality Check is scheduled to ship this month bundled with LANauditor 3.1, priced at $495; current LANauditor users can buy Reality Check for $59.
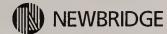
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Circle Reader Service #49

SAP set to add data warehouse links to client/server apps suite

By Barb Cole
Phoenix

A new version of SAP AG's client/server application suite with tighter links to data warehouses and other vendors' applications will take center stage at the company's Sapphire '95 user conference here next week.

R/3 3.0, a set of integrated financial, human resources and manufacturing applications, will include built-in technology for pulling data from R/3 applications into a data warehouse.

In addition, the client/server-based application suite will be able to share data with the company's R/2 mainframe-based applications as well as non-SAP applications.

"We're not moving to R/3 Release 3.0 until next year, but it should be fairly easy to do as a result of some of the migration facilities that are coming in the new version," said Ruth Rowedder, chief information officer at Pentax Corp. in Englewood, Colo.

Bernd Killer, SAP's technol-ogy marketing manager, said the new offering should be out around year-end.

An API called Application Link Enabling (ALE) is key to SAP's effort in extending its applications' reach. Using ALE and SAP's development tools, users will be able to meld existing applications from SAP and other vendors with R/3 3.0 software modules.

Analysts said that Version 3.0 could help transform the firm's products into an open platform for integrating applications from multiple vendors.

"With ALE, [SAP] is providing plumbing between R/2 and R/3, as well as linking its applications to external applications," said Henry Morris, research director in the applications group at International Data Corp. in Framingham, Mass.

The next version of R/3 should also help users retrieve fresh operational data for use in decision-support systems, known as data warehouses. The integration will automate the generation of database tables, queries and reports in data warehouse environments, Killer said. Typi-cally, users need to write custom code to generate these items.

Oracle Corp. recently aired plans to provide similar hooks in its application suite.

Additional enhancements planned for Version 3.0 include built-in workflow management, automated software installation and enhancements to the manufacturing modules.

The company also plans to discuss at the user conference a scaled-down version of R/3 that's supposed to be easier to implement and manage. That software is expected next year. ∎

IBM entices users to trade in their wares

By Michael Cooney
Austin, Texas

Want to make $100,000? Throw those Digital Equipment Corp., Sun Microsystems, Inc. and Windows-based boxes out the door, bring in IBM gear, and Big Blue will pony up some green.

According to a letter obtained by *Network World*, IBM has launched an aggressive offering, known as Future-Path, under which it will give $1,000 to $100,000 to users migrating at least 50% of their current workload to IBM products.

In fact, the deal includes migrating to any product IBM sells — everything from network software and hardware to Application System/400s, System/390 mainframes, RISC System/6000 workstations, and AIX and OS/2 operating systems. The Future-Path document states that IBM will help users select applications and hardware to suit their needs and help install it. It also states that special leasing and financing terms are available.

Analysts said FuturePath represents one of IBM's most aggressive competitive winback programs ever. The company has watched others, such as Hewlett-Packard Co., take mainframe

and AS/400 users by aggressive means, and now it is aiming back.

"IBM is saying, 'If you're a customer of Digital, HP or other vendor, then it's time to make the move,' " said Sam Albert, president of the Albert Associates consultancy in Scarsdale, N.Y. "It's a smart strategy, and it accentuates the new aggressiveness IBM has been trying to develop. This sort of program was done locally before but never on a national level like this."

"Any incentives are a good deal, and we'd certainly look at them," said George Cemdanovs, the comptroller with Lauri, Inc., a maker of educational toys in Phillips Avon, Maine. "We haven't been made aware of FuturePath, but we'll be looking into it."

Others said the offer was a bit late.

"We have IBM hardware and software, so I am not sure what the program would mean for us," said Jeff Stone, director of information systems for the Eugene, Ore.-based Neste Resins Corp., a division of Neste Oy, a Finland-based oil firm. "Monetary incentives would have been interesting when we converted our HP 300s to AS/400s."

IBM executives declined to talk about FuturePath or how recently converted customers might benefit from the program.

Products must be ordered by Nov. 30 and installed by Dec. 29. ☞IBM: (800) 946-9426, Dept. M02.

> *"It's a smart strategy, and it accentuates the new aggressiveness IBM has been trying to develop. This sort of program was done locally before but never on a national level like this."*

Perot

which it intends to open to the public as a demo as early as this week — to test the viability of simultaneous radiology and videoconferencing applications for several hospitals wishing to share expertise among medical specialists.

Perot enlisted the aid of several vendors, including Cisco Systems, Inc. and IBM for ATM gear, and carriers, such as AT&T.

The DS3 network currently runs between Perot's data center in Richardson, Texas, and the Dallas Infomart technology building downtown, which is where users will be able to go to experiment with the network. Several hospital sites are slated to jump on the network soon.

Long said that today's applications speaking shared-LAN protocols such as IP and Novell, Inc. IPX do not yet take advantage of ATM's efficient transport technology. Perot searched for developers who had built their applications to map directly into ATM cells, as opposed to speaking LAN protocols, but there were none, he said.

So Perot used an IP-based interactive magnetic resonance imaging application from BRIT Systems and InSoft, Inc.'s IP-based conferencing application.

The results indicate that "TCP/IP has to be redone [to support] larger windows" in applications that use the protocol, Long said. That will let more data and receipt acknowledgment packets flow simultaneously through the net, he added.

Currently, TCP/IP applications allow about 4,000 frames of data and receipt acknowledgments in the network at one time. In a TCP/IP network, the origination source must wait for acknowledgments before sending more traffic, and the relatively small TCP/IP window size means ATM's network bandwidth is underutilized while the application waits, he explained. Long suggested a 32,000-frame

window as more appropriate for ATM.

Users launching ATM networks also should pay close attention to their equipment vendors' software, Perot learned. The company discovered that the version of software running on its Cisco Systems, Inc. 7000 routers did not support RFC 1577 — a standard format for mapping different protocols to ATM cells. So Perot and Cisco jury-rigged the 7000 to recognize all frames coming in as IP, Long said.

Also, the CPU in the IBM RISC System/6000 workstations running the InSoft application does not keep up with the net, Long said. "Everyone perceives that when screen-painting is slow, it is the network's fault," he said. But applications such as InSoft's were built with older, slower nets in mind, sucking up a lot of CPU power for compression, he said.

Test bed limits

The test bed is limited in that there is only one ATM carrier, ATM switch supplier and CPE vendor involved. But even in this relatively simple environment, "we've confirmed what we've always known: You don't just pick up the phone and order ATM service," Evans said. "It requires a lot of coordination among vendors and carriers to get things to actually work."

Perot, for example, discovered that when inserting a network monitoring probe into the network, the network could not resynchronize itself.

In addition, MFS Datanet, Inc. was initially brought in to provide ATM local access into AT&T's ATM switch. However, long-haul partner AT&T told Perot that it would not yet support an ATM net interface with other carriers.

It is not clear whether AT&T, which has not publicly stated that it will not support such interfaces with local carriers for frame relay, will maintain the same position in the ATM world.

So MFS is providing dedicated DS3 service from the Cisco 7000 router into the AT&T switch. There was no other choice of a local ATM service provider, said Bill Brown, Perot's manager of LAN/WAN services.

Evans and Brown concluded that users must carefully orchestrate vendor and carrier activities

Perot Systems' *Brown, Long and Evans have found that ATM network components are a step ahead of applications that can take advantage of the high-speed technology.*

by finding out who within those companies has the real ATM expertise, making sure vendor software that's released jibe, and that vendors and carriers are in sync on compatibility testing.

"You'll get a different story from a [vendor] salesperson than you do their chief engineer," Brown said. "You have to do your homework to find the person who will give you the straight story on what a product can actually do." ∎

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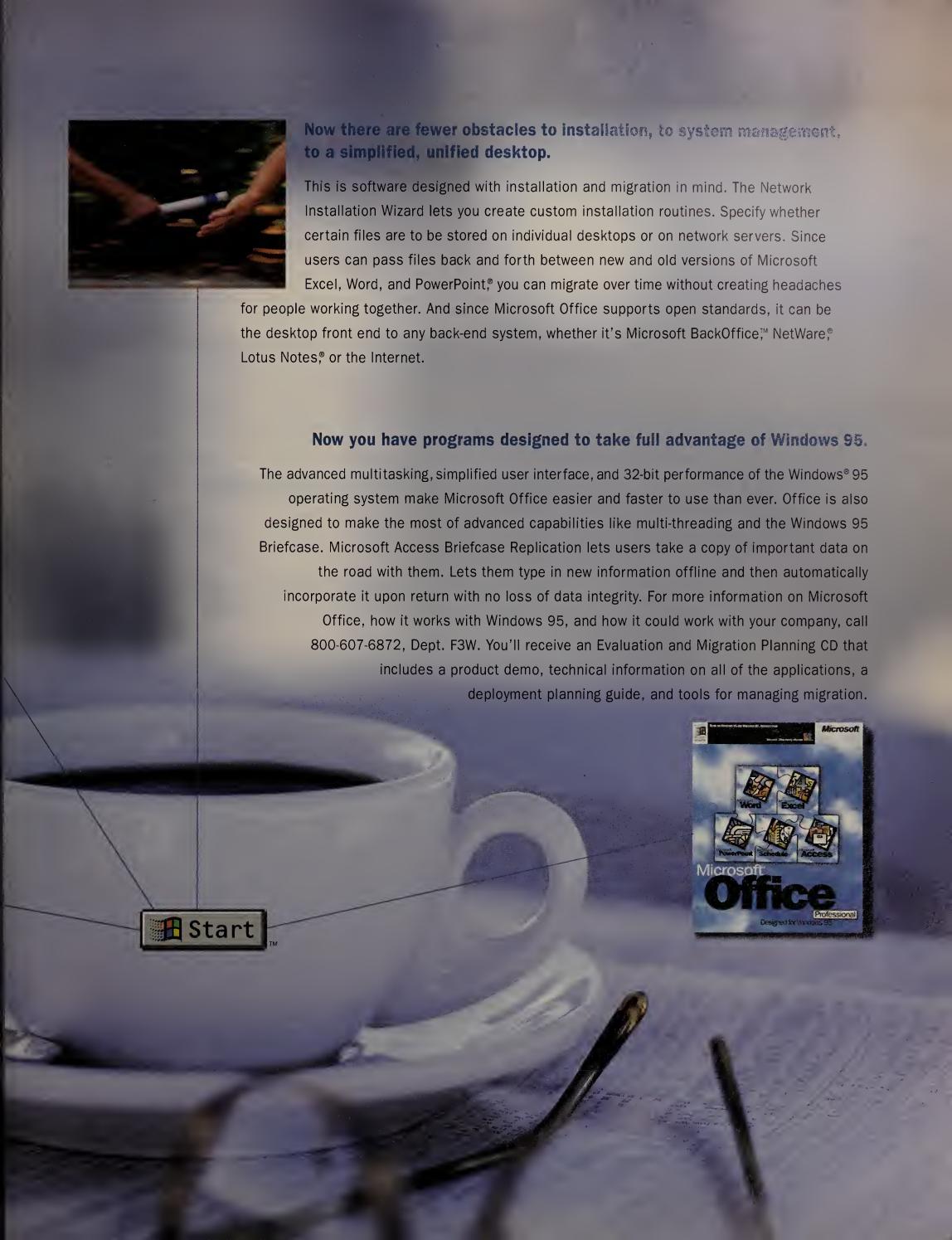
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3Com cranking up fast E-net

Company set to release a high-performance, low-cost, scalable product line.

By Michael Csenger
Santa Clara, Calif.

Putting switched Ethernet into high gear, 3Com Corp. this week will announce a broad suite of 100Base-T fast Ethernet products that increase network capacity and performance while minimizing the need to swap in new technology.

The announcement adds detail to an overall fast Ethernet strategy that 3Com first sketched out about a year ago and includes modules for 3Com's hub, switch and router lines.

"We're going to do for fast Ethernet what we did for the Ethernet market already," said David Flynn, 3Com's product line manager for high-speed networks. "Using custom [Application Specific Integrated Circuit] components, we can deliver high performance at prices low enough to make fast Ethernet an affordable, widely deployed technology."

Welcome changes

3Com users are keen to realize Flynn's vision.

"I figure fast Ethernet can carry us easily for another two to three years," said Dan Sweeney, manager of network operations for Quarterdeck Corp., a software developer that has already started connecting nearly 800 end users with 3Com's fast Ethernet beta equipment.

"If we tried to meet performance demands with FDDI or jumped right to ATM, I could maybe get the network deployed, but there'd be no budget left to actually run the thing and work with it to satisfy our users," Sweeney said.

"With fast Ethernet, we'd have to triple our network load

Reaching LANs over WANs

3Com's remote LAN front was built by acquiring companies with wide-area access technologies and a focus on ISDN.

▶ **Impact** — Remote client hardware and software based on technology from Access Works, which was acquired in February.

▶ **Arpeggio** — ISDN-based remote LAN internetworking tools based on technology from Sonix, which was bought in May.

▶ **Access Builder** — Remote LAN access servers based on technology from Centrum Communications, which was purchased in February 1994.

▶ **Aperture** — High-end remote access concentrators for very large organizations and service providers. Based on technology from Primary Access, which was acquired in June.

right now just to reach 25% utilization, at which point 3Com still gives us a whole bunch of ways to go about it," he added.

Products arrive, more to come

For the NetBuilder II router, 3Com is introducing two fast Ethernet modules with either a 100Base-TX Category 5 cable or 100Base-FX fiber interface. The modules are available now for $4,295 and $4,995, respectively, and provide backbone connectivity between fast Ethernet LANs.

The LinkBuilder FMS 100 hub, part of 3Com's SuperStack family, and the LinkSwitch 1000 workgroup switch have both been previously announced but are now in volume production,

according to Flynn. The products are designed to bring fast Ethernet down to the workgroup level.

By the end of the year, 3Com will deliver the LinkSwitch 3000 SuperStack fast Ethernet switch. With as many as seven dedicated fast Ethernet ports costing less than $10,000, it can be deployed in high-performance workgroups or as an uplink for smaller 10M/100M bit/sec Ethernet switches.

In the first quarter of next year, 3Com will ship fast Ethernet and ATM modules for the LANplex 2500, which is a high-end workgroup and data center switch.

The 2500 currently supports as many as 16 10M bit/sec Ether-

net ports with FDDI uplinks.

The new modules, which have not been priced, will provide interworking between fast Ethernet, FDDI, ATM and regular Ethernet.

3Com's large LANplex 6000 chassis will receive a seven-port fast Ethernet concentrator module for uplinks to an FDDI backbone in the first quarter of next year.

A fast Ethernet switching module is also planned for the 6000, providing seven switched fast Ethernet ports.

By midyear, 3Com will add fast Ethernet to the LinkBuilder Multi-Services Hub by incorporating the same modules employed in the LinkSwitch 1000 and 3000.

An LANplex module that provides 100Base-T and ATM interworking is also being developed for mid-1996, Flynn said.

©3Com: (408) 754-5000.

3Com's fast Ethernet game plan

Second half '95
▶ Fast EtherLink adapter 10/100Base-T4

▶ LinkSwitch 3000 SuperStack 100Base-T switch

First half '96
▶ LinkBuilder FMS 100 hub SuperStack 100Base-T4 hub

▶ LANplex 2500 Department switch 100Base-T modules

▶ LANplex 6000 DataCenter Switch 100Base-T modules

▶ LANplex ATM modules (100Base-T/ATM switching)

▶ LinkBuilder MSH 10/100Base-T switching modules

Cable

ment Corp. that reveals the mammoth potential of CATV networks to deliver broadband data and telephony services to businesses and homes.

Cable companies seem a natural to lead the charge of entrants into local telephone competition: Their cables pass 92 million homes with bandwidth potential far beyond that of today's local phone systems.

But they're not leading the charge.

Even as the government would let CATV companies vie for local-loop users, the companies are sidelined testing the hardware required to use their fiber/coaxial cable networks to support voice and data transmission services.

Technical challenges have slowed the firms but failed to discourage them from pursuing their lucrative goal of sharing in a telephone market that is five times that of CATV.

If they succeed, their participation could bring users lower rates through competition and usher in a new era of broadband services that support everything from voice communications to videoconferencing to remote LAN and Internet access.

Even Teleport Communications Group (TCG), part of a consortium that analysts rank at the top of CATV contenders in the telephony game, is still experimenting.

TCG is in the process of setting up a voice telephone trial outside Chicago involving hardware from Motorola, Inc. and a fiber/coaxial net owned by Tele-Communications, Inc. (TCI).

Cable's rocky road to telephony

1984
Cable Communications Policy Act outlaws phone-cable company cross-ownership.

October
Planned merger of Bell Atlantic and TCI revealed.

February
Bell Atlantic/TCI merger abandoned.

July
The TCG-TCI Arlington test starts.

1984 — **1993** — **1994** — **1995**

December
TCI, TimeWarner, Cox, Comcast and Continental unveil competitive access plans.

October
TCG and TCI announce test of telephony over cable in Arlington Heights, Ill., and Sprint, TCI, Comcast and Cox plan to enter telephony market.

With just five users on-line so far, the project will eventually reach a group of 25 "friendlies" — employees of TCG, TCI or Motorola — located in Arlington Heights, Ill., according to Catherine Mason, the TCG manager of the trial.

Menacing problems

Mason's effort is beset by the same problems that menace other cable providers aspiring to become phone companies: turning a downstream-only, broadcast network into a two-way net that supports switched and dedicated links.

"That means everything from regenerators to amplifiers to power-passing taps have to be either upgraded or totally replaced," Mason said.

And it means making these changes while keeping costs low enough to allow a profitable return. That is critical because cable companies are already strapped by the initial costs of installing and maintaining their networks for cable TV delivery, according to Jim Jungjohann, an associate analyst with A.G. Edwards & Sons.

A cost of $200 to $450 per cus-

tomer to upgrade to telephone service is the ballpark CATV companies are trying to hit, Jungjohann said. That would mean an investment of $10 million to $22 million per 50,000 customers. That would make upgrades viable assuming they captured 5% of the homes and businesses their networks pass, he said.

In the Illinois trial, TCG is "significantly overbuilding the fiber network" beyond what is necessary for voice service with the aim of offering high-speed data services — 1.5M bit/sec to the home — by the end of this year.

That makes it hard for Mason to get a handle on what a typical upgrade will cost TCG, but she estimates from $500 to $2,500.

"In the major geographic areas, I think it will be close to $500 or $600, which will be offset by [revenue from] increased penetration in telephony and cable services," Mason said.

Common practice

Others are engaged in similar trials. In New York, Cabletron Lightpath, Inc., a CATV company, has authority to compete in

the local phone market.

It is trialing Northern Telecom, Inc.'s Cornerstone equipment to deliver telephone service over its fiber/coaxial network.

The company also has plans for a similar trial with Motorola CableComm equipment, but Motorola will not be able to provide it until October, according to Lightpath President Joseph Cece.

He said that as trials of equipment conclude this year, he expects the fiber/coaxial telephony equipment to go into full production.

As cable companies upgrade their networks, they are designing the fiber runs so they can more easily drop fiber lines directly to businesses because that is where the demand is for high bandwidth, according to Bob Braden, vice president of network services for Centennial Cellular Corp.

Centennial is an affiliate of the company that is running the Colorado Springs extended LAN telecommuting experiment.

No pricing has been set for 10M bit/sec remote LAN connections like those being trialed in Colorado Springs, but Braden said cable companies would charge at least as much for them as traditional telephone carriers charge for ISDN.

According to Braden, executives in the CATV industry look at the expanding frame relay market as proof that there will be a big market for the data services that cable networks could provide.

"I don't believe there's a cable company in the U.S. that isn't interested in that." ■

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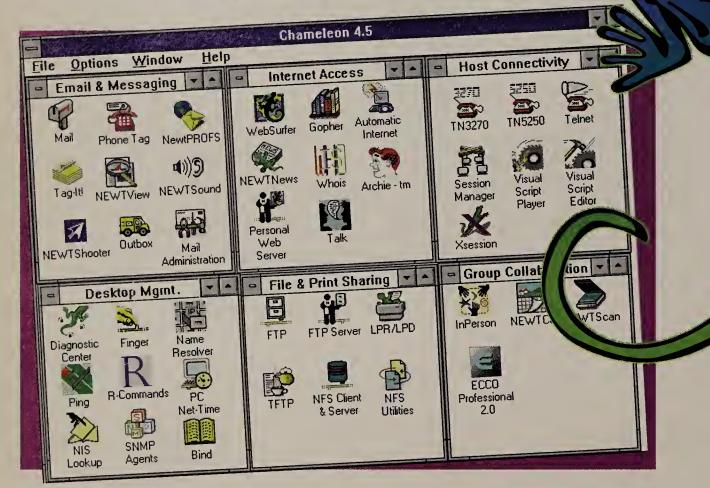
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Briefs

■ **Fujitsu Network Switching of America, Inc.** *announced an* **ATM multiplexer** *with six user-side ports and one ATM User-Network Interface OC-3 network-side port. The SMX-6200 contains a video codex card and can provide DS1 and DS3 circuit emulation for private branch exchange applications. It also supports Ethernet and ATM digital exchange interfaces for LAN interconnections.*

Fujitsu: (919) 790-2211.

■ **Security Dynamics Technologies, Inc.** *last week added Cisco Systems, Inc. Terminal Access Controller Access System+ (TACAS+) support to its ACE/Server program and SecurID card. The combination of the ACE/Server and TACAS+ will help* **protect router-based enterprise nets** *from unauthorized access by providing secure users authentication routines. TACAS+ support will be available for ACE/Server in November for $2,450. SecurID cards will sell for $34.*

Security Dynamics: (617) 431-0770.

■ **Sprint Corp.** *announced a Windows version of its* **electronic billing program.** *Fonview for Windows lets users view their entire firm's telecommunications bill by division and create custom billing reports while running other Windows applications. Available now, Fonview for Windows costs $25 per month per site receiving the bill.*

Sprint: (800) 877-2000.

■ *Long-distance carrier* **LCI International, Inc.** *filed a petition with the California Public Utilities Commission seeking authority to* **offer local phone service** *in California.*

■ **AT&T** *unveiled a new Release 4 of the* **Merlin Legend Communications System** *that supports ISDN Basic Rate Interface. Previous releases of the hybrid key system/private branch exchange provided an ISDN PRI only.*

AT&T: (800) 247-1212.

StrataCom, Fore leaders: ATM driven from the inside

Q&A StrataCom President Dick Moley and Fore Systems, Inc. CEO Eric Cooper, leaders in the wide- and local-area worlds of Asynchronous Transfer Mode technology, respectively, sat down recently with *Network World* Features Editor Paul Desmond and Senior Writer Tim Greene to talk about ATM, what's driving it and where it is headed.

What is the force behind ATM expansion?

Moley: You read that ATM is going to be very slow to develop. Some people say it's going to be at least two years before the significant deployment of ATM in the wide-area network. We reject that notion completely and say that, in fact, ATM is starting to be

StrataCom's Moley

deployed widely and, indeed, its first application — not surprising to us — is frame relay, along with ATM services.

That process is starting now. AT&T is just starting to deploy broadband ATM in its frame relay network. And LDDS WorldCom has just announced it will provide ATM and frame relay services off the broadband fabric. So we see that ATM in the wide-area network is now starting a meteoric rise, and it eventually will take over from all the other technologies.

Cooper: In our world, Ethernet switching is actually the driver to deploy ATM within the premise. The appeal of Ethernet switching is, of course, that you don't have to crack the shell of any desktops. You let your PCs

Fore's Cooper

Lab sails ahead with Magellan Concorde

Argonne taps NorTel switch's scalability, management, accounting functions for its collaborative ATM network.

By David Rohde
Argonne, Ill.
Northern Telecom, Inc. has scored a major victory by having its Magellan Concorde switch chosen by Argonne National Laboratory as the backbone for its high-performance collaborative wide-area ATM network.

Concorde will aggregate traffic arriving over OC-3 (155M bit/sec) carrier ATM links from other research facilities and corporate networks in an experimental grid known as the I-WAY.

The I-WAY is scheduled to debut later this year as a platform for high-bandwidth applica-

tions running across enterprise boundaries (*NW*, Feb. 27, page 1).

In addition, Concorde will serve as the local backbone for the 25-sq.-mile Argonne campus here, where 35 buildings now swing traffic around a dual-star network running Fiber Distributed Data Interface, as well as both switched and hubbed Ethernets.

"The intent is to aggregate traffic and push it out to the building switches," explained Tim Kuhfuss, director of Argonne's Electronics and Computer Technologies Division.

Although one goal of the I-WAY project is to test vendor interoperability, Kuhfuss also wanted to standardize the backbone.

"We'll have one backbone switch, and the interoperability will be at the edge switches," he said.

Bill me

For Argonne, the function of Concorde — which is also marketed by NorTel to public carriers — will be to emulate the role of a telephone central office switch in not only carrying traffic, but also performing a billing function.

Kuhfuss was impressed with Concorde's ability to perform this type of accounting without adding much more overhead to the already overhead-laden ATM cellstream. "One way to look at us is that we're like a telephone company," he explained. "We want to allocate costs directly to the end user, and you don't get that [capability] in workgroup switches."

In addition, Kuhfuss found that Concorde integrated into the laboratory's OpenView net-

What is the I-WAY?

The Information Wide Area Year is a year-long effort to develop a high-performance ATM network to be shared by carriers, research organizations and corporate networks. It is to be demonstrated in December at the Supercomputing '95 conference in San Diego.

Sterling continues courting NetView users

By Michael Cooney
Reston, Va.
Sterling Software, Inc. continued its long-running pursuit of IBM NetView/390 users with a new program that promises to save them as much as 59% of recurring licensing fees.

NetGain Plus program combines systems integration and network management products, and has at its heart SOLVE:Net/Master, Sterling's mainframe-based network management platform. Through NetGain Plus, Sterling will move users off of the NetView/390 platform and integrate their current network management capabilities with NetMaster.

Despite its price advantage, NetMaster never really took off. Once considered the primary competition to IBM's NetView/390, analysts said market forces have kept the product at bay. Sterling hurdles include the

resistance of IBM mainframe shops to make the leap of faith Net/Master would require, the trend to downsize management platforms, and the product's shaky past — it was sold from Systems Center, Inc. to Sterling in 1993, and its status was in question for more than a year.

Nevertheless, Sterling continues to go after NetView accounts — primarily taking aim at users with older versions of NetView who may be considering newer versions of NetView/390. The biggest thing NetMaster has going for it is its price — up to 59% less expensive than a comparable NetView/390 package in some configurations, Sterling executives said.

"NetMaster has been a reliable product, but convincing the 90% of SNA users who have NetView that they need to change is something that's not going to happen on a large scale," said

Thomas Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J.

Sterling executives unveiled a similar NetGain program last year and said it has been successful in converting users to NetMaster but declined to say how many it had won over.

NetGain Plus is different from last year's program because it offers a 9% greater savings. Also, NetMaster sports new features that weren't in last year's offering. For example, NetMaster can now let users monitor the performance of SNA devices as they communicate through the front-end processor.

Sterling officials said that compared to a four-year IBM Group 40 mainframe license, NetGain Plus customers could save about $79,600. The onetime charge for NetView 3.1 on a Group 40 machine is $135,600, compared with $56,000 for NetMaster.

©Sterling: (703) 264-8000.

PCS-to-PBX bridging services now en route

Wireless carriers devise ways to meld user dialing and discount plans with mobile communications.

By Joanie Wexler

Corporate phone bills could soon skyrocket if telecommunications managers aren't astute about blending emerging personal communications services (PCS) with their land-line phone services.

Users getting a single phone number that follows them around might find it convenient to bypass the corporate dialing plan by using the cellular network, some observers said — a move that could rack up steep bills.

To avert this danger, carriers will soon be offering private branch exchange extension systems that allow users to go cellu-

lar in both campus and wide-area scenarios; calls made from within a building or campus are billed at negotiated land-line rates, while those made off-campus shift to the going cellular rates.

For example, Bell Atlantic NYNEX Mobile recently began testing Motorola, Inc.'s InReach radio system in-house as a precursor to offering a PCS-to-PBX bridging service. That offering is scheduled to go commercial late this year, Bell Atlantic NYNEX Mobile told *Network World* last week.

InReach lets a user carry a cellular phone that is mapped to a PBX or Centrex extension when the user is on the company's premises. "Users are then billed by the local telephone carrier at whatever discounts they may have negotiated," explained Maggie Aloia, a Bell Atlantic NYNEX Mobile spokeswoman. Similar radio systems are reportedly under development at other firms, such as AstroNet, Inc. and Panasonic, Inc. Without such systems, users could force their companies to shell out a lot of money.

Cultural differences

Martin Singer, vice president of business development and planning at Motorola's Cellular Infrastructure Group, said it is common for GSM digital cellular users in Europe to use their GSM phones — rather than PBX-attached phones — all the time.

"If this were to happen in the U.S., phone bills — even assuming cellular rates come down — could rise by two or three times," said Steve Sazegari, managing director at Tele-Mac, a consulting firm in Foster City, Calif.

For its part, AT&T Wireless

Services will launch next year personal base stations for its digital cellular network, based on Time Division Multiple Access technology.

Users will put a $200 to $300 base station in their homes and pay a flat fee of about $10 in addition to their monthly local carrier service fees for the privilege of using that phone at home, on the road and in the office, according to the firm.

When users take their phones on the road, calls are billed at regular cellular rates. When they arrive at work, the system will launch a cellular connection to their PBX.

Users will then pay transport fees at the corporate land-line rate, but there will still be a $10 or so per-user monthly fee, explained AT&T spokesman Bob Ratliffe.

This merging of home, mobile and work communica-

tions could result in a dilemma for companies that must decide whether to foot the bill for home equipment and fees that make workers more available, analysts noted. Users themselves are torn by just how available they want to be (see graphic).

And despite vendor efforts, the logistics of blending PCS with existing corporate net infrastructures are far from being worked through, according to Bill Frezza, president of Wireless Computing Associates, Inc., a consulting firm in Yardley, Pa.

"I'm not convinced the ergonomics of having the same phone in your kitchen and on the road makes sense," he said. "What phone does my family use at home when I am carrying the phone to work? Where does it ring?"

Many services will rely on intelligence in the network, with multiple phone numbers sitting behind a user's main phone number, for forwarding communications to mobile users. But Frezza advocated a personal mobility manager — a PC-based peripheral managed by an individual worker or a networking manager. ∎

Where's the wireless beef?

The number of potential PCS users wanting to leverage wireless services at work is still dwarfed by those looking for personal communications spanning their home and on-the-road environments.

- Home only — 34%
- None — 17%
- Don't know – 4%
- Home and mobile — 20%
- Home and work — 6%
- Mobile only — 9%
- 2% - Work only — 8%
- Home, mobile and work

Survey base: 800 businesspeople and consumers; both cellular and noncellular phone users.

SOURCE: BIS STRATEGIC DECISIONS, NORWELL, MASS.

WorldCom offers Notes users fast Web page setup

By Tim Greene
Houston

WorldCom, which offers on-line access to Lotus Development Corp. Notes servers, now offers a service that transforms Notes documents into World-Wide Web sites.

With NetFusion, WorldCom will create and maintain Web pages for users who also buy WorldCom's Notes server service.

The users replicate a Notes file to a WorldCom server, and WorldCom converts the file to HyperText Mark-up Language (HTML), the coding for Web postings, and then posts the file on a Web server.

The cost of the service consists of a $2,000 charge for a one-time licensing fee for Walter Shelby Group, Ltd.'s Tile software, which WorldCom uses to make the HTML translation, as well as $200 per month for the first 25M bytes of data posted. Each 25M bytes after that costs an additional $100.

Glenn Gabriel Ben-Yosef, president of Clear Thinking Research in Boston, said the service seems to be designed for users who do not want to bother with the details of setting up a Web page. But, he noted, using available HTML conversion software is probably easier than using Notes.

Frontier lets users monitor net traffic with 3-D visualization

By Jim Duffy
Chelmsford, Mass.

Frontier Software Development, Inc. last week rolled out graphical user interface (GUI) software for its network probes and monitors that allows users to view traffic patterns across their enterprise networks.

Called Netscout Expert Visualizer, the GUI provides a three-dimensional, multicolored display of network conditions. It enables users to easily visualize, isolate and assess traffic behavior and problems by creating logical and physical views for selected topologies, traffic types, devices and attributes, Frontier said.

"It gives you a helicopter view" of network traffic, said Nathan Kalowski, vice president of marketing for Frontier.

Netscout Expert Visualizer runs on Hewlett-Packard Co., IBM and Sun Microsystems, Inc. Reduced Instruction Set Computing-based workstations. It gathers data from Frontier's Netscout probes and analyzers, including those that conform to the Remote Monitoring standard, and assembles it into customized views of the network, based on data link, network and application layer activity.

The data link view provides information relative to performance, topology and traffic patterns for one or more segments. The network layer view displays information related to the performance of IP, IPX, DECnet, VINES and AppleTalk subnetwork and enterprise network traffic.

The application layer view provides information on the traffic and usage patterns of specific

applications, such as Lotus Development Corp. Notes and cc:Mail, and Sybase, Inc. databases.

"It gives us a quick front end to see what's going on between hosts by application," said a network manager at a large New York-based financial institution.

FRONTIER'S NETSCOUT EXPERT VISUALIZER

Model	Platform	Price
9001	Sun SPARCstation	$4,995
9002	HP 9000	$4,995
9003	IBM RS/6000	$4,995

Version 1.0 available September 1995

Objects on the Netscout Expert Visualizer screen are sized based on the traffic activity associated with them. For instance, switches would vary in size because some would handle more traffic than others. Similarly, connections between devices would be represented as thick or thin lines based on the amount of data running through them.

Users can them zoom in and drill down on these objects to attain more detailed information on network behavior.

Products from Frontier competitors HP, Armon Corp. and Axon Corp. share some similarities with Netscout Expert Visualizer, said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo.

"But no one's taken the visual paradigm as far as Frontier has," he added.

Netscout Expert Visualizer costs $4,995 and will be available later this month.

©Frontier: (508) 244-4000.

Magellan

work management platform from Hewlett-Packard Co. As a result, Concorde switches, controllers and network management modules can be placed at separate sites and still be administered jointly.

"The management interface is very slick," Kuhfuss said. "There wasn't a lot of major retraining to be done."

While the bandwidth demands on both Argonne's campus network and the I-WAY remain unpredictable, they could become enormous due to the laboratory's work in virtual reality.

To meet these demands, Kuhfuss sought a switch-like Concorde whose capacity scales down to 10G bit/sec and up to 80G bit/sec, supporting both constant and variable bit rate applications.

"Argonne's use of the Magellan Concorde demonstrates yet another level of the switch's flexibility," said Al Delorenzi, NorTel's vice president of Magellan marketing.

Among other things, the Concorde switch must support the laboratory's Advanced Photon Source, a circular accelerator two-thirds of a mile in circumference that can run about 80 communications streams at 155M bit/sec per stream. ∎

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AT&T to Sprint: Do your deal minus foreign funds

By David Rohde
Washington, D.C.

One of the major protesters against Sprint Corp.'s proposed global venture with France Telecom (FT) and Deutsche Telekom (DT) is apparently offering a compromise. But it is one that Sprint may find hard to accept.

AT&T has told the Federal Communications Commission that it should approve Sprint's joint venture but reject plans by FT and DT to buy 20% of Sprint's stock.

"Sprint's record earnings in the first half of this year establish that it does not need FT's and DT's investment in order to be successful," AT&T attorneys told the FCC in a Sept. 1 filing.

The Sprint venture is designed to let the three carriers offer users telecommunications services between foreign countries as well as between the U.S. and other countries.

But while AT&T and other carriers complain that FT and DT are monopoly carriers that should not be allowed to invest billions of dollars in a U.S. carrier, they have begun to form their own global alliances with FT and DT competitors so as not to be left behind.

Through its own global alliance, known as Uniworld, AT&T is quietly allying with the French water utility and a German consortium known as Communications Network International (see graphic).

The German group is 25% owned by Deutsche Bank AG, with the rest owned by two major German manufacturing and engineering companies.

The latest developments in the protracted debate about the Sprint-FT-DT venture — announced in June 1994 and now code-named Phoenix — come at a crucial time for Sprint.

The No. 3 U.S. carrier is left without an approved partner while AT&T and MCI Communi-cations Corp. global ventures plow ahead with new virtual private-line and frame relay offerings transcending national boundaries.

Sprint officials last week continued to tie the global venture to the 20% equity investment valued at about $4 billion.

"It's not a question of either/or," said a spokesman from Sprint. "France Telecom and Deutsche Telekom are only proposing to make an investment in Sprint, not to begin operations in the United States."

In contrast to AT&T's offer, MCI on Sept. 1 once again called for the outright rejection of the Phoenix deal until the European telecommunications markets are open to full competition on Jan. 1, 1998.

The new comments were requested by the FCC after the Department of Justice approved the deal with some restrictions that forced Sprint to alter its original plan. The FCC is expected to rule on the deal this fall. ∎

BusinessBriefs

IBM, in association with the **National Security Association** and **CompuServe, Inc.,** will begin a nationwide campaign to diminish the spread of computer viruses. Through Sept. 20, users can call IBM at (800) 429-1849 or CompuServe at (800) 542-3388, Representative 691, to learn about virus protection solutions from antivirus manufacturers across the U.S.

Downloadable freeware will also be available. More information can be obtained on the Internet by connecting to http://www.ibm.com/security.

MCI Communications Corp. and Charlotte, N.C.-based **First Union Corp.** are teaming up to offer a rudimentary form of home banking over the Internet. First Union will distribute Netscape Communications Corp.'s Navigator browser to enable home users to efficiently use the bank's World-Wide Web site over MCI's Internet access service.

MCI and First Union are working on eventually extending the service to allow banking transactions to take place over the Internet.

Looking to broaden its mix, **Wireless Telecom, Inc. (WTI),** which markets mobile computing products and services to resellers, last week said it has signed agreements with several vendors to carry their wireless products. Items now available from WTI include wireless modems from Apex Data, Ex Machina, Inc.'s Notify messaging software, InfoExpress' E-mail and news service, Melard Technologies, Inc.'s Ranger handheld workstation and MOST, Inc.'s laptop-to-database synchronization software, which works on the RAM Mobile Data packet radio network.

WTI: (303) 338-4200.

CrossComm Corp. has licensed IBM's High Performance Routing (HPR) software that it intends to add to its XL line of routing and switching platforms. CrossComm will make HPR commercially available on XL products next year.

WAN MONITOR

Turning the tables: voice rides free

In the "old days," companies implemented large private-line networks that were cost-justified by their voice applications. Later, data applications were sometimes added, riding the network for free by using the incremental, or leftover, network capacity.

My, how things have changed.

Today, you can use this same approach, but in reverse. Take our consulting firm, which has three U.S. locations, as an example. We use AT&T's Inter-Span frame relay service to handle our data applications. We have Ascend equipment in the remote offices and Bay Networks equipment at our headquarters. Data applications are critical to us since they support the core of our consulting work. These applications include E-mail, file transfers, client/server applications, remote server backup and data collaboration. Oh, and we're a Macintosh shop.

Our frame relay network made economic sense because it saved us time compared to using slower modem-based connections. And, in our line of work, time is money.

Frame relay also allowed us to add remote client/server applications, didn't cost much more than what we were spending on modems for these transactions and allowed for new ways to share information and collaborate on work.

Where does voice fit into this? We don't know, but it's sure going to be interesting to find out. Our on-net voice calls between our three main locations typically cost more than $1,000 per month. But all of these calls could be "free" if we routed them over the frame relay network.
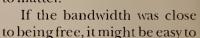
The popularity of voice-over-the-Internet products shows that people will trade off certain things for cost. The questions are how much do you lose, and will it meet existing application requirements?

There are other issues involved, and these concern the necessary architecture and whether changes to the current network infrastructure would need to change substantially. We are beginning to look at our alternatives and will keep you posted on what we find out. In fact, we plan to begin testing voice over frame relay in our test lab during the fourth quarter.

There are three leading vendors in the voice-over-frame relay equipment market.

ACT Networks and Micom have been offering frame relay equipment that supports voice for several years. And, as of August, Motorola joined the party. If you are in the process of evaluating a frame relay network, you may, like us, want to proactively explore how on-net voice applications can benefit from the frame relay network. The same could be said of videoconferencing and data conferencing, especially as desktop video becomes cheap enough to matter.

If the bandwidth was close to being free, it might be easy to justify real-time data conferencing and other desktop collaboration applications.

The issue of voice over frame relay could also change the distribution of your RFP and affect your final selection of equipment, since not all equipment will support voice at this time. If you think about this early on in the data network planning process, it might save your company a lot of money on voice calls down the road.

Briere is president and Heckart is director of broadband at TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at danny_briere@telechoice.com or christine_heckart@telechoice.com. They will share this space with Scott Bradner, whose column will appear next week.

Daniel Briere and Christine Heckart

WorldCom

Robert Dana, manager of NetFusion, said the service costs less than the price of the conversion software, and eliminates establishing and maintaining a Web server.

NetFusion comes with some free consulting time from World-Com to help design Web pages, but details of that arrangement are still being finalized.

WorldCom also provides users with Web page templates.

Tile is a Web publisher that competes with Lotus' InterNotes Web publishing software. Dana said WorldCom chose Tile because at the time the arrangement was negotiated, Tile had more features and was priced at less than half the cost of the InterNotes license. Additionally, WorldCom can design pages for the user, and that is billed on a case-by-case basis.

To update the page, the user updates the database and replicates it to WorldCom. Because the WorldCom server sits between the Web user and the user who has posted the Web page, it acts as firewall protection for the user who posted the page.
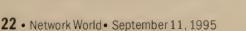
WorldCom also last week announced a partnership to sell GroupQuest Software, Inc. Notes application software over the WorldCom network.

Users who buy any of World-Com's services — electronic mail, discussion groups, news services or Notes servers — can access a GroupQuest catalog that describes more than 50 Notes applications.

Also, WorldCom announced a second partnership to sell U.S. Robotic, Inc. 28.8K bit/sec modems over the WorldCom net at a 30% discount.

At the same time, WorldCom lifted its surcharge for users who want 28.8K bit/sec access to its network.

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UNISYS

THE INFORMATION MANAGEMENT COMPANY

I-NET unveils data repository, apps mgmt. service

By Jim Duffy
Bethesda, Md.

I-NET, a provider of network management services, has come out with a new offering that enables users to size up the potential benefits of two of the industry's hottest developments: data repositories and application management.

The Enterprise Service Center is offered as an outsourced service whereby I-NET manages the customer's net or as an "insourced" service in which the provider constructs an internal network control center for clients. The service will help reduce the operational costs of information nets by as much as 30%, claimed Raj Ananthanpillai, vice president and general manager of the enterprise management service group at I-NET.

The repository is a database enhanced with an intelligent, real-time expert system. It serves as the "glueware" between different management systems so they can exchange timely management data and store data consistently on all types of managed entities.

The repository also provides a graphical front end that serves as a single point of control over the managed environment and as the interface to other management equipment, such as help desk, performance monitoring and storage management systems.

The application management piece of the Enterprise Service Center integrates off-the-shelf application management packages with data on the various business practices of I-NET clients. The Enterprise Service Center uses the off-the-shelf tools to monitor the applications that use business process data and stores the application management data in the repository.

The expert system component of the repository describes the behavior of the applications and, through this, users can map the performance of their application to the business aspects of the enterprise.

Analysts said I-NET is not unique in offering repository and application management services. Competitors such as SSDS, Inc. in Englewood, Colo., offer similar capabilities. "They have a [data integration] architecture but don't seem to promote it as a repository," said Jill Huntington-Lee, a senior analyst at Datapro Information Services Group in Delran, N.J., referring to SSDS' Distributed Enterprise Service Center offering (*NW,* May 17, 1993, page 2).

I-NET's Enterprise Service Center offering is available now and priced on an individual contract basis.

©I-NET: (301) 214-0900.

ATM

Continued from page 19

live out their lives in peace. Maybe the next time you bring in a PC, you'd consider a different technology, but unless it's a very high end PC and serving a very critical application, it may not need ATM in its current incarnation.

So the prospect of upgrading a hub in a wiring closet to an Ethernet switch is attractive because for a single $5,000 purchase, you've given every desktop a dedicated 10M bits.

That increases the stress on servers that were serving those clients and increases the stress on the backbone network, which previously needed to sync 10M bits from all of these clients. Now they ought to be able to handle the sum of 10M bits from each of them. There are very few backbone technologies and very few server technologies that can do that except for ATM.

How much competition are you seeing from fast Ethernet?

Cooper: Usually the customer who's planning a backbone solution has thought about routers and perhaps thought about fast Ethernet. Fast Ethernet comes to the market ready-made in terms of training and awareness because it's nothing new; it's Ethernet with the speed cranked up.

Now there's really no fast Ethernet switching. That's really the thing that would be most comparable to an ATM switch in the premise.

There's probably some exceptions to that; I think Bay Networks has a product. But there's not a big market in fast Ethernet switches that can accept 100M bits on all their inputs. It's much more of an issue whether the customer is ready for ATM. If they're not, it's often a 10M-bit switch that they are ready for.

What do you see as the biggest stumbling block to ATM?

Cooper: I think it's partly the bewildering array of choices and architectures that the customers have. We need to do a better job of not focusing on just today's cost of installation but really the whole life cycle, to help the customer walk through the likely growth of their network. They need to understand where their network is going, where their applications are going and what really is the road map for a network infrastructure that will scale up with that growth.

Moley: I think in our case it's the resistance to change. To change the paradigm from [time-division multiplexing] to ATM is a big step, and I think it requires education and understanding, as well as successful deployment. If you look at frame relay, it took about two years from the early deployments and trials before it exploded suddenly, and everybody agreed that it made sense for saving money.

I think the same is true of ATM. I think we're now seeing the deployment to serious ATM platforms that do serious work as opposed to trials. I think the critical mass is certainly within the next 12 months.

All the problems you read about today that people are suspicious of — cell losses, unpredictability, class of service and those kinds of things — I think that's all proven to be solvable.

I think the switched voice networks will stay, and only when ATM is well proven for all those data and multimedia applications will the carriers say, 'Hold on a second, we now have the widely deployed pervasive ATM fabric.

Perhaps it's time to start doing voice, regular conventional voice, onto this fabric.' ■

LDDS WorldCom and transaction vendors team up

By David Rohde
Atlanta

LDDS WorldCom has moved to fill a gap in its service portfolio by forming a new public data net to offer switched access to wide-area X.25 and IP applications.

The new value-added network, dubbed GridNet International, is majority-owned by WorldCom.

The GridNet network is designed to relieve the burden of protocol conversion and reformatting typically shouldered by host computers in transaction processing networks, said GridNet President O.G. Greene.

Each of four major net nodes will have a Northern Telecom, Inc. DPN packet network switch, a Cisco Systems, Inc. 7000 router to support IP traffic and an access concentrator from 3Com Corp.

> *In the GridNet network, "we will perform protocol conversion at the node level, as opposed to the front-end processor."*

The single GridNet backbone will support three primary services: QwikTrans for low-speed X.25 transmission, primarily for transaction and payment processors; QwikConnect for high-speed X.25 service for bulletin boards and corporate data networks; and QwikLink to provide IP dial network access, including service to Internet access providers.

On many transaction networks, the variety of point-of-sale terminals and multiple transaction types require merchant processors to route transaction requests to numerous hosts, Greene said.

Then front-end processors "have to spend cycles to determine where those messages should be sent," according to Greene.

By contrast, in the GridNet network, "we will perform protocol conversion at the node level, as opposed to the front-end processor," he said. ■

LAN World

Briefs

■ **Backup and storage management software** *developer* **Arcada Software, Inc.** *of Lake Mary, Fla., has acquired competitor* **Sytron Corp.,** *a subsidiary of REXON, Inc. and leader in the OS/2 backup utilities market.*

Arcada: (800) 327-2232.

■ **Microcom, Inc.** *and* **Banyan Systems, Inc.** *announced last week that they will integrate Microcom's LANexpress remote access product with Banyan's VINES operating system and Enterprise Network Services. The Microcom product, a dedicated communications server that provides 115.2K bit/sec access for remote users to VINES, TCP/IP and IPX/SPX networks, will be linked tightly to Banyan's directory and other net services..*

Microcom: (617) 551-1000.

■ **Digi International, Inc.** *has unveiled a* **remote access server** *designed to give users dialing in to Ethernet networks the same range of functions they would have if they were connected locally to the net. LANAserver is a 32-bit Reduced Instruction Set Computing processor-based system that allows data transmission rates of 230K bit/sec per port. It costs between $1,695 and $3,895.*

ATM provides therapy for aching network backbones

First in a two-part series about the use of Asynchronous Transfer Mode technology on the LAN.

By Paul Korzeniowski

ATM technology is designed to plug in anywhere in a company's enterprise network, but for the most part, it's appearing first in the LAN environment. There, ATM typically makes its debut on the backbone and then moves to the desktop.

ATM possesses many alluring features, including easy network up-grades, support for a range of data types and fast transmission speeds. The first two features hold long-term promise, but high speed sparks most companies' initial interest, industry experts say.

The need for speed is evident first in backbone networks, which typically are used either to link disparate LANs or to provide access to servers that store common information. As the amount of data moving among departments increases or the volume of information pumped to and from servers grows, backbones get saturated. Fast Ether- net, Fiber Distributed Data Interface and switched Ethernet all offer bandwidth boosts but not as much as the 155M bit/sec available with ATM.
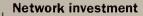
Backbone connections accounted for 60% of ATM LAN links in 1994, said Vertical Systems Group in an ATM and frame relay report published last month. That number will rise to 64% in 1998, according to the market research firm.

Still, not many companies need ATM transmission speeds yet, said Terry Robinson, a product manager at Chipcom Corp. in Southborough, Mass. And those that do rarely need it outside the backbone.

Network investment
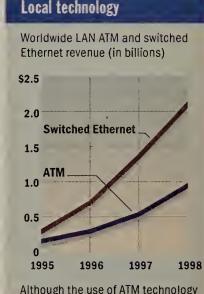
Financial services firms are among those crossing the divide. For example, Pacific Investments, Inc. of Newport Beach, Calif., in March 1994 decided to upgrade its Ethernet backbone to provide faster transmission speeds and better response times. The backbone connected 275 employees who work on Dell Computer Corp. PCs and Sun Microsystems, Inc. workstations.

After considering ATM and FDDI, Pacific Investments determined that the former was more flexible and had better long-term potential, said Jerry Coleman, a systems and network manager at the firm.

In January, the company deployed two Fore Systems, Inc. ASX-200 ATM switches to support 155M bit/sec backbone transmissions in two buildings. Pacific Investment's LAN environment also comprises Bay Networks, Inc. wiring hubs for providing users with desktop Ethernet connections and FiberCom, Inc. Ethernet-to-ATM routers for linking users on different floors to the ATM backbones. Network performance has improved significantly since the ATM installation, Coleman said.

ATM hotbed

Traffic loads at universities also often warrant deployment of the cell-based, high-speed technology. In the fall of 1993,

Local technology

Worldwide LAN ATM and switched Ethernet revenue (in billions)

Although the use of ATM technology on backbone networks and to the desktop will increase for the next several years, deployment of another fast LAN technology, switched Ethernet, will outpace it.

SOURCE: VERTICAL SYSTEMS GROUP, DEDHAM, MASS.

Microsoft and Novell eye NOS security certification

**By Peggy Watt
and Kevin Fogarty**
Berwyn Heights, Md.
Operating systems from Microsoft Corp. and Novell, Inc. are in the process of joining Unix as certified by the National Computer Security Center for use in strict security environments such as the Department of Defense.

Microsoft late last month received Class C2 certification for Windows NT 3.5 Server and Workstation.

Still under evaluation are Windows NT's network components, including its network protocols, as well as combinations of Windows NT and third-party network interface cards (NIC) that are already C2-certified. Microsoft expects later this year to receive C2 certification for Windows NT 3.51 and the network protocols.

"Windows NT was architected from the ground up to meet C2 criteria," said Megan Bliss, Microsoft's product manager for Windows NT Workstation. Microsoft had received requests for such a degree of security from financial institutions as well as government accounts, she said.

Novell is lagging behind Microsoft in the certification process, but the Provo, Utah, company submitted a more comprehensive model of secure networking, according to Dave Clare, Novell's product-line manager for NetWare core services.

Under evaluation is Novell's NetWare security architecture, rather than just the operating

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NetWare directory management tools emerge

By Kevin Fogarty
Novell, Inc. and three independent software vendors are separately rolling out new tools for helping NetWare 4.X users manage their NetWare Directory Service (NDS) directory trees.

The products will let users monitor the health of NDS directory trees and replicas of their branches. They will also let users prune and graft those trees, as well as track NDS security and performance.

Such tools are necessary to smooth the migration process from NetWare 3.X and its bindery to NetWare 4.X and NDS, said Robert Sakakeeny, an analyst at Aberdeen Group, Inc. in Boston.

Houston-based BindView Development Corp., which specializes in LAN management tools for NetWare, is first in line with a tool that helps users keep track of their NDS trees.

BindView, formerly the LAN

BINDVIEW PRODUCTS MONITOR NET FROM DIRECTORY TO PC

BindView for NDS gives detailed reports on the content, structure and status of server-based NDS trees ...

... while the enterprise WAM collects workstation auditing data from domain servers and concentrates it in one console.

SNMP finds a new home in electronic messaging systems

Major mail vendors commit to the protocol because of its high availability, flexibility and increased performance for managing messaging components.

By Alex Cullen

Growing corporate dependence on LAN-based electronic messaging as an essential tool for communication and information-sharing has intensified the need for higher availability and better performance of mail systems.

Because of its distributed nature, LAN-based electronic mail requires effective tools for remote monitoring, trouble-shooting and capacity planning. E-mail management and monitoring are complicated by two factors: First, most organizations use multiple E-mail packages, and second, problems with a message system are often symptomatic of underlying network difficulties.

Mail vendors have approached network-based messaging management in several ways.

In one approach, for example, vendors use the E-mail messages for monitoring purposes. This can be as simple as using an E-mail loopback to ensure that all components on a message route are operating, or it can be as sophisticated as using mail-based probes that gather information from message transport agents (MTA) along the route.

In another approach, MTA logging monitors generate alerts to a central site — which can be an E-mail message — when a log-file entry indicates a condition that requires administrator attention. Lotus Development Corp. uses this method in its cc:Mail View software.

SNMP flexibility

To bolster these proprietary approaches, vendors recently have begun turning to the Simple Network Management Protocol for monitoring messaging components. Banyan Systems, Inc. and Lotus already have incorporated SNMP into their products, and Novell, Inc. and Oracle Corp. have indicated plans to do so, too.

The flexibility of SNMP, combined with its use for a variety of other management purposes in a network, makes it attractive as the standard management protocol. After all, the standard being used for managing routers, hubs, servers, databases and other applications is likely to have some merit for messaging

components.

A key component of the SNMP standard is the Management Information Base (MIB), which provides a virtual representation of the device information and parameters available to an SNMP manager. The current

MIB standard, called MIB-II, includes specifications for network services in general, plus specific definitions for messaging transport and directory services. These are defined in RFC 1565, RFC 1566 and RFC 1567, respectively. The last two RFCs together are often referred to as the MADMan RFCs.

RFC 1565 provides a foundation of capabilities for network services. Through the MIB defined by this RFC, a manager can determine the operational status — up, starting, congested, inoperative — of a process; the number of active associations, or sessions, with other network processes; whether these other processes are client or peer-to-peer services; the name of the connecting process; the number of failed associations by originator or responder status; and the error

To bolster these proprietary approaches, vendors recently have begun turning to SNMP for monitoring messaging components. Banyan and Lotus have already incorporated SNMP into their products.

messages of the last failed associations.

RFC 1566 provides the core of messaging management functionality. This RFC defines an MTA model with input and output queues and some intermediate message storage. The MIB allows the MTA and its associated queues to be viewed as a single, simple entity, making it easy for a manager to get aggregate information on the MTA status.

The MIB also makes it possible to drill down to get detailed information on specific queues and functions. For example, net managers can find out the number of messages received, stored and transmitted since service initiation.

Other information available for queries includes:
- Received, stored and transmitted message volume (total number of kilobytes transferred).
- Received, stored and transmitted total of message recipients.
- Oldest message stored.
- Currently active and total inbound and outbound associations.
- Last inbound and outbound

associations.
- Rejected inbound and failed outbound associations.
- Error messages for the last failed associations.
- Time to next scheduled retry.

RFC 1567 is based on the X.500 directory model. In X.500 directories, Directory User Agents send queries to Directory Service Agents (DSA), each of which contains only a portion of the total directory service tree. If a DSA does not have the information it needs to respond to a query, it passes the request to the next DSA. RFC 1567 provides for the monitoring of DSA functions.

Because of its X.500 bias, RFC 1567 is most applicable today to Novell's NetWare Directory Services and Banyan's StreetTalk network operating system directories. It is less appropriate for E-mail system address books provided by Microsoft Corp. in MS Mail and Lotus in cc:Mail. This RFC's value will increase as the major vendors migrate their products to client/server architectures and X.500 directories.

Among other information, RFC 1567 lets the SNMP manager determine:
- Active associations between DSAs.
- Total associations between DSAs since start-up.
- Total requests serviced and the type of response provided.
- Association failures and, specifically, those due to problems with authentication.

SNMP extensions

The SNMP standard also lets vendors define private MIB extensions so they can adjust the protocol to their unique product capabilities.

For messaging managers, the most useful extensions might be user mailbox statistics or the status of messaging-related processes such as message store maintenance or conversion functions.

For example, Banyan complements the MADMan RFC specifications it uses for StreetTalk directory and Intelligent Messaging MTA information with private MIB definitions for user mailbox information, message store maintenance and message compression functions, and some directory services. It also implements SNMP traps — alert functionality — for many MTA

The SNMP standard also lets vendors define private MIB extensions so they can adjust the protocol to their unique product capabilities. For messaging managers, the most useful extensions might be user mailbox statistics or the status of messaging-related processes.

and message store parameters.

In another case, Lotus provides SNMP MIB definitions for all the information in the Notes Statistics structure but does not support the MADMan RFCs in NotesView. Notes Statistics lets a manager access Notes server information regarding CPU and disk utilization, user mailbox and dead-letter queues, as well as find data on replication partners, the time and duration of replication sessions, and more.

The SNMP-based approach to messaging management offers a number of advantages over mail-based probes, remote logging or other proprietary schemes. They are:
- Near real-time monitoring of messaging systems.
- Easier correlation of network information to underlying causes since SNMP is used by other server and network components.
- Use of one management system by net operations personnel for messaging, distributed systems and network management.
- Potential to manage multivendor E-mail networks, including gateways, with a single standard.

Despite its advantages, the SNMP approach has some drawbacks, some of which will be addressed in the next version. They are:
- End-to-end support of TCP/IP is usually necessary, although not required.
- Transient connections, such as dial-up or X.25, are not well supported.
- SNMP polling can generate significant network traffic.
- SNMP traps, generated when significant events occur, have no guaranteed delivery to the management station.
- Security is weak. Because of this, vendors usually provide only a monitoring capability.

Although few mail vendors support the SNMP protocol in their products, it's apparent that most major providers intend to do so. Since SNMP is emerging as the de facto standard for messaging systems management, E-mail managers should include it in their technology plans.

Cullen is a principal consultant with Onsett International Corp., a technology management consulting firm in Cambridge, Mass. He can be reached via E-mail at acullen@onsett.com.

The RFC roster for messaging management

The Simple Network Management Protocol Management Information Base-II standard includes specifications for network, message transport and directory services in three RFCs:

RFC 1565 for network services lets a manager determine the operational status of a process; the number of active associations, or sessions, with other network processes; whether those processes are client or peer-to-peer services; the name of the connecting process; the number of failed associations by originator or responder status; and the error messages of the last failed associations.

RFC 1566 for messaging transport services defines a message transport agent model with input and output queues, and some intermediate message storage. It also makes it possible to drill down to get detailed information about specific queues and functions, such as the number of messages received, stored and transmitted since service initiation.

RFC 1567 for directory services is based on the X.500 directory model and provides for the monitoring of Directory Service Agent (DSA) functions. For example, it lets the SNMP manager determine active associations between DSAs and the total number of requests serviced.

Microsoft certification programs arise

CPS and CSE programs measure staffers' level of expertise in Microsoft environments.

By Ronald Nutter

With Microsoft Corp.'s Windows, Windows for Workgroups and Windows NT products playing expanded roles in corporate networks, it is becoming increasingly important to find a yardstick to measure knowledge of these environments.

Microsoft has two certification programs that fit the bill.

The entry-level certification is called Microsoft Certified Product Specialist (MCPS), requiring students to pass tests on one of the following operating systems: Windows, Windows Workstation Version 3.5 or Windows for Workgroups.

If your situation involves a help desk environment or teaching users how to use Windows-based applications, having someone who has passed one exam may be sufficient. If you use Microsoft applications such as Excel, Project or Word, an elective is available to cover these products. An individual who has passed multiple exams is seen as qualified by Microsoft to install, configure and support the operating systems and the elective products the individual has been tested on.

The next certification level is called Microsoft Certified Systems Engineer (MCSE). To qualify, a candidate must pass exams for four operating systems and for two electives.

An individual pursuing the MCSE certification is required to pass exams on Windows, Windows NT Workstation Version 3.5, Windows NT Server Version 3.5, and Networking with Microsoft Windows or Networking with Microsoft Windows for Workgroups.

Microsoft recognizes that individuals with CNE (Certified Novell Engineer), ECNE (Enterprise Certified Novell Engineer) or CBE (Certified Banyan Engineer) certificates possess a base of networking knowledge and will waive the requirement for the network exams.

The two elective exams can be picked from the following group: SQL Server Database Administration for OS/2, SQL Server Database Administration for Windows NT, LAN Manager Advanced Network Administration, Mail Enterprise, SQL Server Database Implementation, LAN Manager Network Administration, SNA Server and TCP/IP for Windows NT.

If you are thinking of requiring staffers to pursue certification, take the time to download a copy of Microsoft's Education and Certification Roadmap from ftp://ftp.Microsoft.com/services/MSedcert/e&cmap.zip. This will give you the latest information available on the program and sample tests.

When doing further research on this program, you will see references to the Microsoft Certified Professional (MCP) certification. This is a global reference to both certifications discussed here.

Study up

Staffers studying for the exams have several options. Microsoft Authorized Technical Education Centers (ATEC), for example, are located in major domestic cities and in a growing number of other countries.

Taking the courses is a good idea for individuals new to the products or for those that want to ensure they know as much as they think they do. To find the ATEC near you, check your local phone book or call Microsoft at (800) 636-7544; in Canada, call (800) 563-9048.

If you cannot afford to have staffers out of the office taking classes, independent study is an option. Microsoft has kits available for most exams.

The Microsoft Roadmap information packet contains an extensive list of reference materials that can be helpful in studying for the exams. Prospective students may find most of the references at a local bookstore.

Earlier this year, Microsoft, in conjunction with third-party testing organization Drake Prometic, introduced the Microsoft Certified Systems Engineer Fast Track Offer. For $500 ($400 for CNEs, ECNEs or CBEs), students received a box containing a coupon good for six exams for the price of five (five for the price of four for CNEs, ECNEs or CBEs), a not-for-resale copy of NT Server Version 3.5 and a training voucher from Microsoft good for one free independent study course or $500 off an instructor-led training course. Although this offer expired in April, Microsoft may offer this package again.

Wave training

Wave Technologies International in St. Louis offers a number of options for those pursuing MCP certification.

Wave has domestic and international sites that provide on-site training. Students who complete a course can confer with technical support representatives for three months after course completion. This added benefit should prove useful to those studying to pass the various Microsoft exams, ensuring they understand the material and know of the latest curriculum changes.

Wave's CSE Study Guide is broken down into chapters by exam. The material is covered in considerable detail. Students learn what makes the products work, not just the material needed to pass an exam.

The Guide will also serve as a valuable reference book long after the students have taken the exam. Screen shots of the program being tested are presented to explain the material. When the SETUP.INF file is discussed in the chapter covering the Windows 3.1 exam, for example, students not only read about each section of the file but learn what each statement in the section pertains to.

Wave has also built a substantial self-test product called MCSE Challenge Interactive, a Windows-based simulation of the questions you can expect to see on the MCSE exams.

The Wave exams can be taken as many times as required. At the end of each test, students have the option of printing out the questions they missed so they can review appropriate additional material before trying again.

With the CSE Study Guide and MCSE Challenge Interactive bundle, students also receive a CD-ROM containing the MCSE guide and additional source documentation going into even more detail on exam topics. The CSE Study Guide and MCSE Challenge package costs $199.

Students ready to take the exams need to call Drake Prometric at (800) 755-3926 in the U.S. Each exam costs $100. Most exam locations have Saturday hours, and some are also open in the evenings. Total cost for the exams will run between $100 to $600 depending on the certification path chosen and if a student passes the exams on the first try.

When important

Deciding when to have someone in-house get certified vs. relying on a vendor with certified personnel is something that must be carefully considered.

Having one or more employees with at least the MCPS certification has certain advantages. For instance, these individuals should be able to handle day-to-day problems without calling in outside help.

In the event you do need outside assistance, these staffers will provide valuable information as to configuration and environmental data that might require several hours of investigation by someone unfamiliar with your installation.

When evaluating a vendor with MCSE talent on-staff, look closely at the elective exams the individuals have passed to see how closely their expertise fits your needs. If they concentrated on the SQL exams and your environment dictates working with Microsoft's SNA Server, this vendor may not be the best choice for the project.

Also, look at how long the individuals have been working with the Microsoft products separately from how long they have had the Microsoft certification. People who have just passed the exams but haven't been working with the product very long could be just good test takers.

Having department members with one or both of these certifications will also be helpful from a project management standpoint when dealing with outside vendors because they can help ensure the companies stay on track and keep your best interests in mind. When you need help with your mission-critical network, who would you rather have working on it: people who say they know what they are doing or those who can prove they understand the subject matter?

Nutter is a contributing editor and works for a Novell Platinum reseller and Authorized Service Center in Lexington, Ky.

Certifiably qualified

In order to get Microsoft Corp.'s certification, students must pass tests on operating systems and elective products. Once they do so, the company considers them qualified to install, configure and support the respective lines.

Certification level	Operating system	Electives
Microsoft Certified Product Specialist	Windows, Windows Workstation Version 3.5 or Windows for Workgroups	None required
Microsoft Certified Systems Engineer	Windows, Windows NT Workstation Version 3.5, Windows NT Server Version 3.5, and Networking with Microsoft Windows or Networking with Microsoft Windows for Workgroups	Two of the following: SQL Server Database Administration for OS/2, SQL Server Database Administration for Windows NT, LAN Manager Advanced Network Administration, Mail Enterprise, SQL Server Database Implementation, LAN Manager Network Administration, SNA Server or TCP/IP for Windows NT

Security

system. A C2 rating for NetWare would be a stamp of approval for the NetWare server, NetWare client and the connection between the two, Clare said.

Novell's security architecture would let users install any desktop operating system on a NetWare LAN if the NIC is certified to work with NetWare, he said. Microsoft's model depends on users running Windows NT at the client and server, Clare said.

Novell is working with Cordant, Inc., whose Assure NIC contains workstation security software. Cordant is the first in a series of NIC vendors expected to certify their products as C2 secure with NetWare.

An entire NetWare network could be C2-certified if the workstations used Cordant's certified NIC. Users could plug in other C2-certified cards as well without violating the C2 specification.

To be certified under the National Computer Security Center's Trusted Computer System Evaluation Criteria, nets must meet the Trusted Network Interpretation specification in an evaluation process that typically takes more than a year.

An operating system must provide file access controls and user authentication procedures, including unique logons and passwords.

Its security system must provide a complete auditing process for all user actions. And the operating system must cleanse RAM so previously stored data cannot be captured by another application process and read by unauthorized users.

Evaluation is done by the National Computer Security Center under the auspices of the National Security Agency, an organization here that awards certification. ∎

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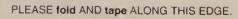
LAN WORLD

Net backbone

for example, the Department of Radiology at Duke University Medical Center in Durham, N.C., needed to install a backbone so radiology department users could move complex images stored on Silicon Graphics, Inc. servers.

The department has 400 users who work with Apple Computer, Inc. Macintoshes, IBM PCs and Unix workstations from Hewlett-Packard Co., Silicon Graphics and Sun.

Louis Humphrey, the director of radiology informatics, said his group evaluated ATM and FDDI, and selected ATM because its switched architecture is more flexible and offers better performance than FDDI's shared topology.

The department relies on Bay Networks Ethernet wiring hubs and switches to provide users with desktop connections. On the backbone, seven users directly connect to one of four Bay Networks LattisCell ATM switches. The rest are connected via Bay Networks routers, which convert Ethernet transmissions to ATM.

> *"FDDI offered us no real options for providing our users with more bandwidth," said Allen Robel, a senior network technical adviser at Indiana University in Bloomington.*

The switching features proved to be a bane as well as a boon, Humphrey said. "With switching, there are more options for making connections, so it is more difficult to develop an efficient design," he explained.

ATM also beat out FDDI when the Rollins School of Public Health at Emory University in Atlanta decided to install a new backbone in the summer of 1994. Digital Equipment Corp. VAX and Alpha systems support complex applications for 95 faculty researchers.

"Our users work with complex mathematical models, which need a lot of bandwidth," said Barbara Maaskant, the director of information services at the university.

Because users transfer huge files, the Rollins School of Public Health wanted a technology faster than FDDI, making ATM the only possibility.

The school offers users Ethernet and FDDI connections via Cabletron Systems, Inc. Multi Media Access Center (MMAC) wiring hubs. Initially, the school connected MMAC wiring hubs to the ATM network but upgraded to MMAC-Plus hubs for its ATM connections at the end of 1994.

The MMAC hubs front-end a Fore ASX-200 switch that supports 155M bit/sec transmissions. Cisco Systems, Inc. 7000 routers move information from floor to floor and among the different types of networks.

The network has functioned smoothly, but Maaskant said she wants better management tools.

Like its southern counterparts, Indiana University at Bloomington wants an ATM backbone. Its deployment plans have been altered, however, because of product unavailability.

The university, which has 20,000 users on approximately 300 LANs, in 1994 decided to replace its then 4-year-old FDDI network.

"FDDI offered us no real options for providing our users with more bandwidth," said Allen Robel, a senior network technical adviser at the university.

The university wanted to go with one vendor for all of its ATM equipment. "We don't expect vendors to iron out interoperability issues for a couple of years," Robel explained. "By limiting our selection to one supplier, we ensured different products will work together."

The university selected Cisco for its diverse ATM product line and because it had satisfactorily used the company's AGS+ routers for five years. The school believed Cisco would deliver on its ATM promises, Robel said.

However, Cisco failed to meet the expected ship date for its ATM router connections, so the university's plans to build an ATM backbone have been delayed. This past summer, the school swapped the AGS+ routers with Cisco 7000 series routers, which have more processing power. It expected to upgrade to ATM by the end of the summer but now has to wait.

"We can only change our net when students are away, so our next opportunity will be in December," Robel said.

The University of Oregon, which sup-

NetWare
Continued from page 1L

Support Group, Inc., has announced BindView for NDS, a tool that gives users detailed reports about the status of an NDS tree, including security audits, performance history and objects such as user accounts and print queues.

The Report Manager in BindView for NDS lets net managers browse the NDS tree and gather information such as hardware and software configuration, as well as settings for servers throughout the network. It also can store a predefined set of baseline performance statistics against which users can judge future network performance.

The Security Audit and File Server Documentation modules provide data about how the tree is partitioned, the amount of disk space available on servers and NetWare Loadable Module usage. They also let users store that data.

BindView is also shipping an upgrade to its BindView Network Control System that includes the Enterprise Workstation Audit Manager, which lets users centralize auditing of workstations across the enterprise as well as a NetWare password analysis tool.

Upcoming NDS management tools include:
■ Novell's DS Manager, which is designed to plug into the company's ManageWise program, will allow users to poll NetWare servers and build a map of NDS partitions, then prune or graft them. The product is due around year-end.

■ Preferred Systems, Inc. of West Haven, Conn., is working on an update to its DS Standard NDS management tool that will make the product easier to use. It will include AuditWare for NDS, a module that can track and report on security status and security breaches within NDS.

The enhancements should be available during the first half of next year.

■ Scottsdale, Ariz.-based NetPro Computing, Inc., a leading directory tool vendor in the Banyan Systems, Inc. VINES market, is working on a tool for NDS called DS Expert.

The product will provide many of the same functions as Novell's DS Manager, but it will add more comprehensive reporting capabilities, better performance and a more detailed performance history function. It is due to go to beta testing within weeks.

©BindView: (800) 749-8439; NetPro: (602) 998-5008; Novell: (800) 638-9273; Preferred: (203) 937-3000.
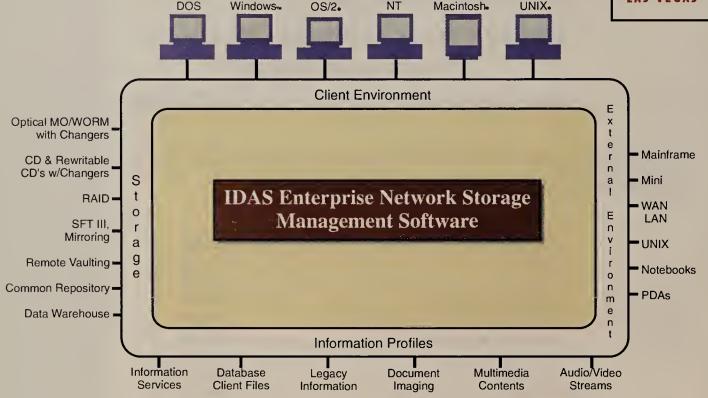
Net backbone
Continued from page 5L

ports 7,000 users at its Eugene campus, also has begun using ATM for its backbone.

The university operates a mixed environment that includes Ethernet and 100VG-AnyLAN hubs from HP, 100Base-T hubs from Kalpana, Inc. and Madge Networks, Inc., and FDDI hubs from Digital.

Engineers exchanging complex documents were creating performance problems on the university's FDDI network, according to David Meyer, a senior network engineer at the university.

In early 1994, the university began to search for ATM equipment to boost the speed. It chose Fore's ASX-200 switch for a backbone network that linked 100 users.

> *"Companies should move slowly into ATM. The technology holds a great deal of promise but is in an early development stage."*

Since then, the university has expanded its backbone to include three ASX-200s and three Lightstream 100 ATM switches from Cisco. Information is moved to the backbone via Cisco 7000 routers.

ATM backbones undoubtedly have helped these and other users bolster bandwidth-hungry LAN environments, but they are not yet refined enough. Meyer noted, for example, that few ATM switches yet support the ATM Forum standard for running TCP/IP transmissions across the network or for supporting quality-of-service parameters.

Indiana University's Robel offered this advice: "Companies should move slowly into ATM. The technology holds a great deal of promise but is in an early development stage."

Korzeniowski is a freelance writer in Malden, Mass., who specializes in networking and data communications topics.

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Circle Reader Service #3

Whitetree, Xyplex combine ATM and LAN traffic in new product releases

By Michael Csenger

Adding yet more options to the ATM world, Whitetree, Inc. and Xyplex, Inc. have introduced a collection of products for mixed ATM and traditional LAN networking.

Whitetree has announced shipment of its WS3000 Workgroup Switch. Introduced earlier this year, the switch was scheduled to ship in June but met development delays until now.

The WS3000 combines traditional Ethernet switching and 25M bit/sec ATM switching on shared, autosensing ports.

Its 12 desktop ports accept Category 3 cabling, which both Ethernet and ATM25 can use. Each port automatically detects whether traffic is Ethernet or ATM25, and switches it accordingly.

Both half- and full-duplex Ethernet are supported on each port. ATM LAN-emulation software supports Ethernet-to-ATM interworking and will be upgraded to the final ATM Forum LANE 1.0 by December.

"I don't think ATM25 is going to be a huge market, but it's a viable niche and for Whitetree, it's probably a great step-pingstone," said Tam Dell'Oro, president of the Dell'Oro Group consultancy in Menlo Park, Calif. "There are going to be users operating in switched Ethernet and ATM environments."

An additional 155M bit/sec OC-3 port provides high-speed trunking to an ATM LAN backbone, and an optional Stacking Bus module — due by year-end — will let users stack as many as 12 switches together for high-density applications.
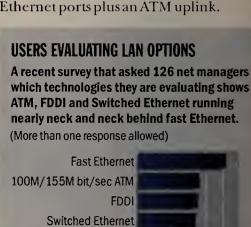
The WS3000 costs $7,795 in its standard 12-port Ethernet/ATM25 configuration. An optional 155M bit/sec ATM trunk module costs $1,395.

Xyplex partners with ATM

Separately, Xyplex last week introduced the 7000 Series of stackable ATM switches and software based on its partnerships with other ATM vendors.

Connectware, Inc.'s CELLerity ATM switch is the basis of the stackable 7000 Series, to which Xyplex adds its own net management applications, said Pam Snaith, a Xyplex senior product manager.

A 4G bit/sec ATM switch fabric connects ATM switch modules within a stack, each module supporting a different type of ATM interface. Five modules are available with 12 OC-3 fiber ports, 16 Category 5 OC-3 ports, 16 ATM25 ports, 12 100M bit/sec TAXI ports, and four switched Ethernet ports plus an ATM uplink.

USERS EVALUATING LAN OPTIONS

A recent survey that asked 126 net managers which technologies they are evaluating shows ATM, FDDI and Switched Ethernet running nearly neck and neck behind fast Ethernet.
(More than one response allowed)

Technology	
Fast Ethernet	
100M/155M bit/sec ATM	
FDDI	
Switched Ethernet	
100VG-AnyLAN	
Fibre Channel	
Switched token ring	
25M bit/sec ATM	
CDDI	
Other	

0%   30%   60%

GRAPHIC BY TERRI MITCHELL   SOURCE: SAGE RESEARCH, NATICK, MASS.

Additionally, Xyplex introduced three new ATM modules for its Network 9000 chassis-based enterprise hub. These 520 Series ATM Edge Router modules use ATM software acquired through a partnership with ZeitNet, Inc. (*NW,* Sept. 4, page 23) and allow LAN traffic from the Network 9000 hub to be over an ATM backbone using LAN emulation or Classical IP Over ATM (RFC 1577).

The new 520 Series modules include single-port ATM interfaces for OC-3 multimode fiber, single-mode fiber and Category 5 copper, and cost $8,995, $11,995 and $5,995, respectively. They are available now.

Pricing for the 7000 Series modules ranges between $11,995 and $14,995, except for the Ethernet-to-ATM switch module, which costs $7,995. Shipments will begin in the first quarter of 1996.

©Whitetree: (415) 855-0855; Xyplex: (508) 952-4700.
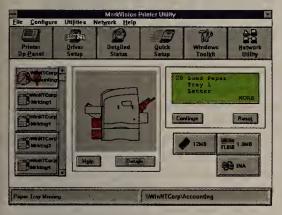
Lexmark print manager to run on Windows 95, OS/2 Warp

By Joanne Cummings
Greenwich, Conn.

In moves aimed at easing printing and print management in diverse LAN environments, Lexmark International, Inc. is expected to announce later this month new clients for its MarkVision utility and a print device for portable computers.

Lexmark, based here, said its MarkVision network print management utility will run on Microsoft Corp. Windows 95 and IBM OS/2 Warp clients. The software, which previously worked on Windows 3.1X clients only, lets administrators remotely configure, monitor and troubleshoot Lexmark printers throughout a site or an enterprise from a central PC.

Net administrators *running the MarkVision print management utility on Windows 95 will be alerted to problems by a change in the printer icon, which can be viewed from the task bar.*

The client/server software resides on an administrator PC and the LAN-attached printer.

The Windows 95 version allows the MarkVision icon to be added to the Windows task bar. The icon's appearance will change when an error is detected on any printer. The OS/2 Warp version lets users monitor printer and job status from within the operating system's Workplace Shell. When minimized, the MarkVision icon will change when printer errors are detected.

The MarkVision software also will have other new features. For instance, the software will let remote administrators lock or unlock printer operator panels to prevent unauthorized changes to settings, and it will let administrators control access to MarkVision via user network privileges.

The new version also has enhanced job statistics that enable administrators to time- and date-stamp every job printed. Those statistics can be collected and stored so spreadsheets can be used to analyze printer usage or allocate costs for supplies and maintenance.

The new version also has a tool kit that can be used to download and store fonts, overlays and blank forms to the printer flash or disk memory.

MarkVision is free to users who buy new Lexmark printers and to existing customers, who can download the enhancements from the Internet (http://www.lexmark.com), CompuServe (Go Lexmark) or the Lexmark bulletin board system at (606) 232-5238. The new versions for OS/2 Warp and Windows 3.1X will be available Sept. 25, while the Windows 95 version will be available in November.

On Sept. 25, Lexmark also plans to unveil a device that enables infrared-equipped portable and mobile computers to transfer files or print directly to LAN-attached PCs and printers, respectively.

The device, called MarkNet IR, comes configured with two bidirectional parallel ports, an external power supply, MarkVision print management software and Puma Technology's TranXit wireless file-transfer software.

The device can be connected, via the parallel ports, to either a desktop PC or printer, or it can be connected to both and pass through print jobs when the infrared feature is not in use.

It can transmit data at up to 1.152M bit/sec over distances of up to 3 meters. Serial port devices are limited to just 115K bit/sec over 1 meter, according to the company.

MarkNet IR will be available by the end of the month for $279.

Lexmark: (800) 891-0331.

Cummings is a freelance writer in Marlborough, Mass.

Triticom adds SNA, OSI support to protocol analyzers for Ethernet

By Joanne Cummings
Eden Prairie, Minn.

Triticom released a version of its software-only protocol analyzer for Ethernet that adds support for Systems Network Architecture and Open Systems Interconnection protocols.

The LANdecoder/e Version 3.0 software resides on any 80386 DOS-based PC with at least 2M bytes of RAM. The product's new protocol suite includes IBM's SNA as well as the ISO's 8473 CLNP, 8073 Transport Layer, 8327 Session Layer, 9542 ES-IS and 10589 IS-IS.

Like earlier releases, Version 3.0 software can analyze protocols over Novell, Inc. NetWare, Apple Computer, Inc. AppleTalk, Microsoft Corp. LAN Manager, IBM LAN Server, Banyan Systems, Inc. VINES, and TCP/IP, as well as Sun Microsystems, Inc. and Digital Equipment Corp. LANs.

In addition, the software can now operate as a protected-mode application using the DOS Protected Mode Interface. This lets LANdecoder/e create a packet-capture buffer as large as 16M bytes and decreases the product's conventional memory overhead from 615K bytes in the previous release to just 140K bytes in Version 3.0.

The new version also lets network managers save captured packets to disk whenever the products RAM-based capture buffer fills up. Previously, the product would just stop capturing packets once the buffer was full.
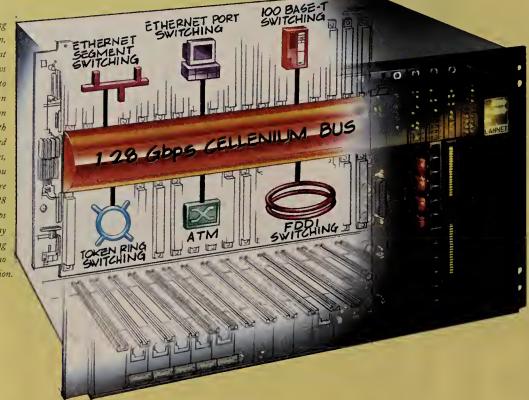
Version 3.0 also has built-in support for additional network adapter drivers, including those from Western Digital Corp. and 3Com Corp., as well as PCMCIA adapters.

LANdecoder/e 3.0 is priced at $945.

©Triticom: (612) 937-0772.

Simulator module helps administrators weigh LAN changes

By Joanne Cummings
Pittsburgh

American Hytech Corp. has added a simulator software module to its NetGuru suite of LAN design and analysis tools.

The new module, called NetGuru Simulator, is designed to give LAN managers a fast, low-cost method for simulating the performance of proposed networks or network modifications, the company said.

"Say you have a LAN with a large amount of CAD/CAM traffic," said John Dwight, marketing manager at American Hytech. "If you then need to add five salespeople to that same segment, NetGuru Simulator will show you exactly how those additions will affect the CAD/CAM performance."

NetGuru Simulator is a software module that runs on any Windows-based PC. It works with the company's existing NetGuru Designer/Manager software module to simulate performance under a variety of LAN configurations and then design a LAN optimized for performance or cost, Dwight said.

To simulate traffic conditions, a user defines parameters, such as the addition of new users or applications, and the simulator module shows a graphical depiction of the changes on the LAN. These graphs can be configured by the user, printed, copied to the Windows clipboard or even frozen during a simulation to view a particular time slice.

Users can take the results of the simulation and use the Designer/Manager module to design the LAN with optimized parameters. NetGuru Designer/Manager will then validate the design by comparing it with standard LAN configurations using an internal rule-checking database. This ensures that all LAN components have been accounted for before a network is built or modified.

The database supports Ethernet, token-ring, Arcnet and internetworked configurations.

NetGuru Simulator is available for $995. A package of the simulator, NetGuru Designer/Manager and an on-line LAN design reference book, called Net-Book, costs $1,495.

©American Hytech: (412) 826-3333.

NET RESULTS

3Com makes a pass at the big time

Out here in Silicon Valley, we are used to being guinea pigs for the latest technology fad, but this did not prepare us for 3Com Corp.'s latest idea.

The acquisition-minded net equipment company has reportedly entered into a deal with Candlestick Park and the San Francisco 49ers to have its name associated with the park and the team until January of the year 2000.
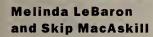
(3Com is also reportedly talking to another Candlestick Park resident, the San Francisco Giants.)

What is the price for the privilege of being linked with the reigning Super Bowl champion team and its home field? A cool $4 million.

The deal includes renaming the park to (please hold back your applause) 3Com Stadium, 3Com Park or 3Com Field, as well as a joint advertising program with the 49ers.

The marketing machine at 3Com, apparently bored with running print ads about token-ring networks, is branching out into the realm of athletic shoes, soft drinks and underwear makers by aligning with not one specific sports hero, but an entire team.

Melinda LeBaron and Skip MacAskill But will football really help sell network gear? Is the average consumer of Pepsi, Nike and Fruit of the Loom products the same buyer of stackable hubs and remote office routers?

Obviously, this will broaden 3Com's name recognition. It is the ultimate image ad campaign.

SuperStack goes to the Super Bowl

With the Super Bowl coming to Candlestick, er, 3Com Stadium in 1999, the 3Com name would be broadcast far and wide to households that believe ATM is a banking term, routers are woodworking tools and hubs are something on your four-wheel drive truck.

Though this won't provide an audience for anything technical, 3Com may have success targeting users of the home office products from its Personal Office Division.

So how will football and networking be portrayed in these new ad campaigns?

We have a sneaking suspicion that words like "winning team," "teamwork," "touchdown" and "quarterback" will be sprinkled through ads showing 49ers quarterback Steve Young extolling the virtues of SuperStack. Maybe we'll even be treated to Adapter Card Day at the ballpark or a Joe Montana signature line of ruggedized Ethernet switches.

And how about that name: 3Com Stadium (or Park or Field)? Will 3Com catch on like other nonsense names made up of letters and numbers, like 3M, WD-40 and R2D2?

This temporary name change smacks of gratuitous self-promotion. 3Com has made one of the most successful turnarounds in the networking market, but it seems that the company not only believes its own press, but 3Com is also "breathing its own exhaust," to quote one 3Com employee.

In the San Francisco Bay area, the change of Candlestick's name could create a backlash of ill feelings against the presumptuous company that dares to change the name of a local landmark. It would be like changing Fenway Park to Digital Equipment Corp. Stadium.

We shudder to think that this might become a future trend in the networking industry.

Hey, John Chambers of Cisco Systems, Inc., we hear the Oakland Raiders are having some funding problems. Maybe Cisco could have its own football team.

And you, Andy Ludwick of Bay Networks, Inc. Why don't you go for something different like the Bay Networks Sharks? Professional hockey and network equipment could be a killer combination. It's got a nice ring to it, huh?

Le Baron is a research director and MacAskill is a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at (203) 967-6700.

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Briefs

■ **Informix Software, Inc.** *of Menlo Park, Calif., has begun shipping new versions of its* **query and database access tools.** *NewEra ViewPoint 2.1 and NewEra ViewPoint Pro now support access to multiple relational databases, including those from Oracle Corp. and Sybase, Inc., as well as IBM's DB2. In addition, NewEra ViewPoint Pro supports Open Software Foundation, Inc.'s Distributed Computing Environment through Informix DCE/Net connectivity software. Available now on Windows, NewEra ViewPoint 2.1 and NewEra ViewPoint Pro are priced at $299 and $499, respectively. Unix versions of both tools will ship by September.*

Informix: (415) 926-6300.

■ *The* **Rock and Roll Hall of Fame and Museum** *opened Labor Day weekend with performances from James Brown, Lou Reed, Soul Asylum and...***Starlight Networks, Inc.**

But the latter went largely unnoticed. The museum's multimedia kiosks, which give visitors video and audio clips of concerts, song clips of artists and a link to the musicians who inspired them, are run with Starlight's StarWorks multimedia networking software on a Sun Microsystems, Inc. SPARCserver 20.

■ **IBM** *has released VisualGen 2.0, an integrated* **visual programming** *environment that generates C++ and COBOL client/server applications.*

The product can be used to develop applications that run as much as 10 times faster than those built with the earlier version.

IBM also added new graphical user interface components, support for multimedia applications and a link to IBM's upcoming TeamConnection for OS/2, an object-oriented development repository now in beta test.

Version 2.0 is priced at $3,999 for the first license and $3,599 for additional copies.

IBM: (800) 426-3333.

Sybase plots to support more complex data

By Barb Cole
Emeryville, Calif.

Sybase, Inc. by year-end will announce plans to support objects and other complex data types in its front-end tool, middleware and database offerings, company officials confirmed last week.

In doing so, Sybase will join chief rival Oracle Corp., which is making a big push to incorporate object support into its product line.

The benefits of object support are many. Objects can boost application productivity through reuse and allow development of complex applications that are more adaptable to today's distributed computing environments.

However, the networking implications of adding complex data types to a relational database environment are unclear, said Katrina Garnett, vice president and general manager of the distributed objects and connectivity group at Sybase.

Moving objects across the net

ON TAP FROM SYBASE

▶ Support for OLE 2.0 in PowerBuilder development tools

▶ An object request broker for trafficking objects across the net

▶ Extended versions of Open Client and Open Server APIs for a consistent client interface to multiple data types

▶ Snap-in modules to let users build text and multidimensional data stores

is almost certain to require more bandwidth than traditional relational data, analysts said.

Garnett said Sybase's goal is to enable end users to access several types of data through a single database interface and a common language. For example, in addition to an object data store, the company plans to offer what Garnett described as snap-in modules for storing text, spatial and time series or multidimensional data.

"We'll end up having these different stores that are optimized for performance, but to the end user, it should look like one database," she said.

Key to this strategy are extended versions of the company's Open Client and Open Server APIs that support complex data types, Garnett said. She declined to specify when those APIs would be available.

Oracle already sells Oracle Text Server, which supports text-based information, and recently acquired multidimensional database technology that it plans to integrate with its flagship database.

Analysts said Sybase's plans are consistent with its approach of specialized servers for different tasks but questioned whether the company could achieve the seamless integration Garnett described.

AT&T Network Notes gives AIDS researchers new way to collaborate

By Annmarie Timmins
San Francisco

Those setting the research agenda for AIDS and immune-system treatment cannot assemble more than once a year because it takes organizers three months just to do the faxing, mailing and phoning needed to get everyone in one place.

But that communication process recently was streamlined when AT&T unveiled Network Notes and introduced one of its early customers, ImmuNet, a nonprofit organization that offers AIDS professionals an electronic work space based on Lotus Development Corp. Notes.

Now Patrick Cosson, ImmuNet's director of marketing, is asking, "Why not meet every day?"

He has proposed a project that would let researchers share information with ImmuNet databases using a connection to Network Notes, which puts Notes up on AT&T's public network. The AT&T service gives businesses the information management and security of Notes without the administration chores or expense.

"Not many organizations are

interested in managing a public network," said Mark Johnson, founder of ImmuNet and chief executive officer of Notes reseller MFJ International. "It is outside the bounds of their core business.

"Our notion is fewer servers, more users per server. The way to get there is to have a massive server. We can't afford that, and AT&T Network Notes provides us that," Johnson said.

The other alternative is communicating through the Internet, Cosson said. But security and reliability are questionable, he said.

ImmuNet survives on volunteers and donations. Cosson, Johnson and a third partner,

New tools update COBOL to operate with client/server

By John Cox

From Austin to Boston, companies are rolling out tools aimed at helping MIS programmers update host-based COBOL applications for client/server desktop environments.

VanGui for RM/COBOL from Liant Software Corp.'s Ryan McFarland division in Austin, Texas, and AppDesigner for Entera from Open Environment Corp. (OEC) in Boston let MIS groups preserve their investment in valuable COBOL applications and data, while making these resources easier to get at via graphical user interface (GUI)-based desktop access and analysis tools.

"A lot of people have decided that COBOL is not modern," said Brian Beaudry, a technical analyst with John Deere Information Systems (JDIS), the IS subsidiary of heavy equipment manufacturer Deere & Co. in Moline, Ill. "That's not true. What is true is that the GUI came late to COBOL."

JDIS is under pressure to give its terminal-based applications, which are used by its parent company and a network of independent equipment distributors, more modern interfaces, Beaudry said. Users want support for Windows as well as easier access to host data.

But Deere, like other companies, cannot afford to do a wholesale rewrite of its large application portfolio. So JDIS is evaluating a beta version of VanGui — and rival products — to attack the user interface first.

With VanGui's graphical de-

signer, developers create Windows-compliant client screens by dragging and dropping objects, such as a radio button or third-party Visual Basic Control, onto an editable window. Instead of then using a proprietary scripting language to control these objects, the programmer uses familiar COBOL statements and data types, according to John Hatcher, general manager of Liant's Ryan McFarland division.

Using other Ryan McFarland products, the finished VanGui application can access data in networked relational databases or host COBOL applications, he said.

The second VanGui component, COBOL Runtime for Windows, is a Windows Dynamic Link Library that creates a COBOL interface to more than 150 Windows API functions.

The new product will be

Who:
ImmuNet

What:
A secure electronic work space for AIDS professionals to collaborate on research and treatment. Service includes E-mail, workflow applications, discussion forms and information databases.

Where:
San Francisco

When:
Web page already up; applications are being developed.

Why:
"The basic notion of ImmuNet is that the answer to AIDS is out there in a thousand little pieces. We have to find a way to connect them," said Patrick Closson, director of marketing

How much:
AT&T estimates a monthly cost of $25 to $80 per user.

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Seer heads down runway with new modeling tools

Application development tool vendor teams up with Bachman in joint development, marketing deal.

By John Cox
Cary, N.C.

Seer Technologies, Inc. recently announced that it is adding improved modeling tools and links with third-party modeling tools to its Seer HPS tool kit for building large-scale distributed applications.

The company also has established a joint development and marketing deal with Bachman Information Systems, Inc. that is intended to create a seamless link between the Seer development environment and Bachman's modeling and database design tools. In addition, Seer will resell the Bachman tools.

"We think a model-driven environment is the key to large-scale, client/server application development," said Neil Edwards, Seer's director of business modeling products. "We're giving our customers a way to preserve their existing models and move them into large-scale client/server applications."

Seer Archetype 1.0 gives business ana-

lysts a set of visual programs for describing and analyzing a business process, such as accepting a customer order. This description identifies each event in the process and the related data flows.

Archetype is available as a stand-alone modeling tool or integrated with Freeway, the Seer HPS development repository.

Modeling information stored in the repository can be used to generate application designs in subsequent steps of the development cycle.
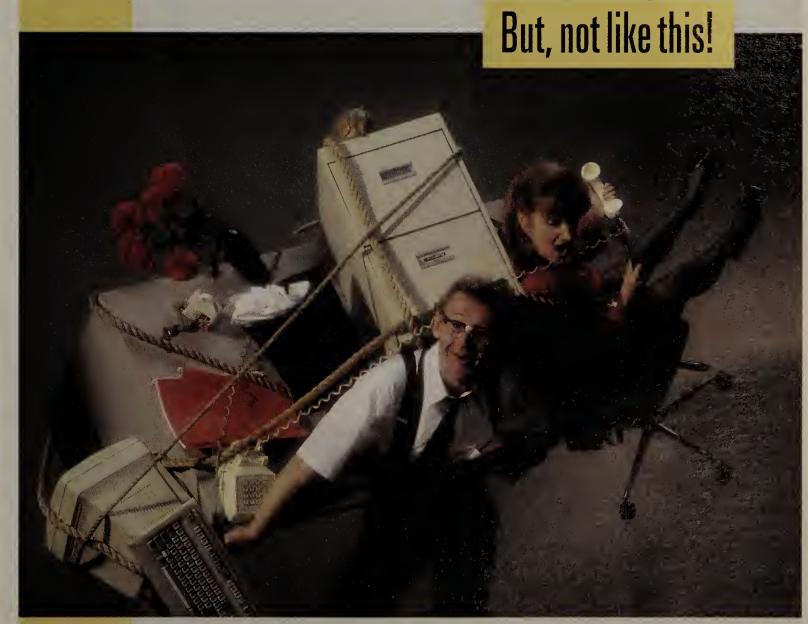
Seer Mediator 2.0 lets application models and designs created with Sterling Software, Inc.'s Advanced Development Workbench, a computer-aided software

engineering tool set, be moved into the Seer Freeway repository. Version 2.1, due out in early 1996, will create a two-way bridge via the repository between the Bachman modeling tools and the Seer HPS tool set.

By early 1996, Bachman will have changed its products to use the Freeway repository's API.

Seer Archetype is available now for $5,000. Seer Mediator Version 2.0 is available now for $10,000.

©Seer: (800) 499-7337.

BusinessBriefs

Platinum Technology, Inc. of Oakbrook Terrace, Ill., has announced the completion of its merger with middleware provider **Trinzic Corp.** of Redwood Shores, Calif. Since January 1994, Platinum has added 14 subsidiaries through mergers and acquisitions.

Novell, Inc. has licensed **Fulcrum Technologies, Inc.'s** Fulcrum SearchServer, a content-based text retrieval system that will be used by Novell's customer support and help desk staff worldwide. Novell also licensed Fulcrum Surfboard, which will let customers -- via the Internet -- search Novell's NetWire on the Internet on-line information service. The Fulcrum search engine runs on Microsoft Corp. Windows NT and Unix servers, with pricing starting at $795 per user.
Fulcrum: (613) 238-1761.

The **Object Management Group (OMG)** is inviting proposals for extending its Common Object Request Broker Architecture (CORBA) 2.0, with changes to ensure 100% portability of CORBA-based services. The changes will let end users share objects written in different languages across different ORBs. The OMG is also inviting comment on a proposed standard to let CORBA objects be accessed and implemented in applications written in the Ada language, a standard in federal and defense-related markets.
OMG: (508) 820-4300.

Oracle Corp. has announced plans to stop selling OracleWare, its Oracle7/Novell, Inc. NetWare bundle, and instead deliver high-and low-end versions of its database that support NetWare Directory Services and Novell's symmetrical multiprocessing (SMP) technology. Oracle will ship two NetWare Loadable Modules — Oracle Workgroup Server for NetWare and Oracle Enterprise Server for NetWare —about a month after the SMP NetWare release.
Oracle: (415) 506-7000.

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Sybase
Continued from page 29

"On the one hand, separate data stores minimize the effects on the installed base, but what happens when you have a transaction that needs to update multiple data stores?" asked Sanjeev Varma, an analyst at Gartner Group, Inc. in San Jose, Calif.

Objects abound

In terms of objects, the company will take a four-tiered approach that includes OLE and C++ support in the Power-Builder application tool, a Sybase object request broker (ORB), object extensions to its middleware and the storage of objects in its database.

"We see OLE on the desktop and [CORBA] on the back end. But we're also committed to supporting SQL 3 and any object extensions that become part of the query language," Garnett said.

The Sybase ORB, designed to facilitate communications between objects, will be based on messaging technology picked up last year through the acquisition of Complex Architectures, Inc.

Garnett said including object support in Sybase products will help customers move from a two-tiered application architecture to a three-tiered one in which application logic is divided between clients and servers, and data is stored on a separate server.

Object support will be part of a database release slated for 1997.

©Sybase: (510) 922-3500.

Network Notes
Continued from page 29

Peter Dobson, forgo a salary, and each manages one of ImmuNet's three servers from their respective homes in San Francisco, New York and Los Angeles. An army of 25 Notes developers writes applications and creates Notes databases for free.

Cosson estimates that about 100 users are taking advantage of ImmuNet's resources, which include directories of clinical trials, AIDS-related resources such as bulletin boards, news groups and buyer's guides, as well as AIDS service organizations.

Cosson is full of application ideas using Network Notes and ImmuNet for the AIDS community. A drug company selling a particular AIDS therapy may want to sponsor a group of AIDS doctors so they can collaborate on cases and share their experiences with using the company's therapy. Doctors all over the country could do their medical rounds over the network.

In both cases, the public network would make communication easier and the Notes databases would store all the knowledge and information shared in an organized and easily accessible way.

Cosson shies away from selling ImmuNet as a way to speed up the cure for AIDS. But he likes to think the potential exists there.

"The basic notion of ImmuNet is that the answer is out there in a thousand little pieces," he said. "We have to find a way to connect them, connect the insights and connect the people." ∎

COBOL
Continued from page 29

released by year-end for under $3,000.

OEC's AppDesigner for Entera takes a different approach, relying on OEC's Entera middleware product for distributed application services and interfaces.

AppDesigner's approach

Developers use AppDesigner on a Windows PC to define an application's business logic, lay out a picture of the application and store this information in a Unix-based repository.

Then developers either write the needed business logic in a COBOL-like fourth-generation language or read it into the application from existing COBOL code.

The final step is to generate the finished application in standard COBOL code, along with the needed calls to the Entera middleware.
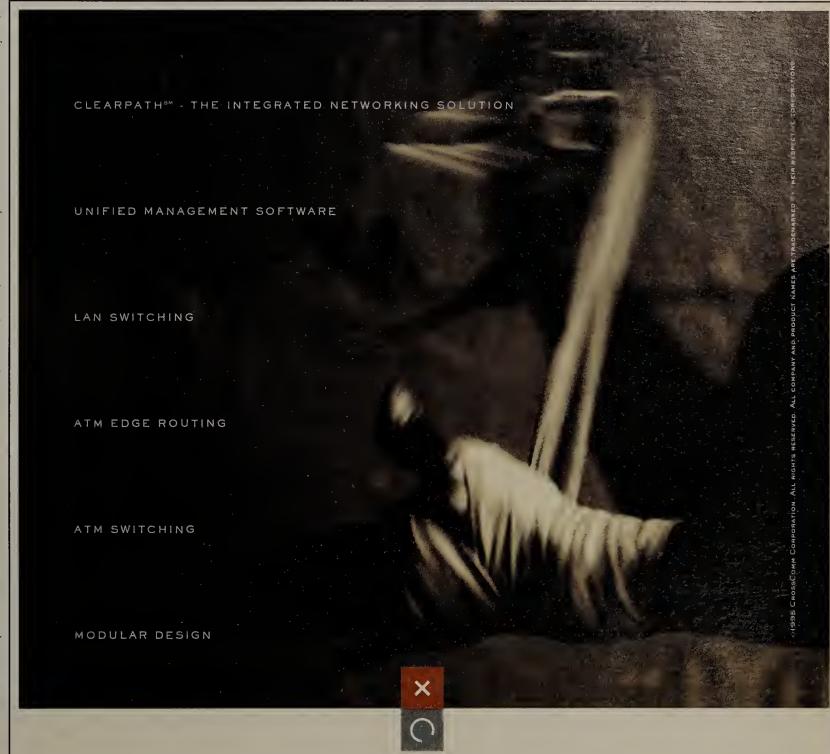
Entera is based on the Open Software Foundation, Inc.'s Distributed Computing Environment or on TCP/IP.

The generated COBOL runs on Unix or MVS hosts, while the client GUI screens can be created with popular client/server tools such as PowerBuilder or Visual Basic, according to Hatcher.

AppDesigner is available now and costs $50,000 for a five-user license. The repository requires an Oracle Corp. database server. OEC will support other databases in the future.

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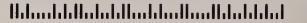
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Boka/yoke-ing your way to success

The Deming Prize is awarded by the Union of Japanese Scientists and Engineers annually to the company with the best total quality management system. The winner must be competitive on a global scale and focused on customers' current and future needs. And the winner is almost always a Japanese company.

This year, however, AT&T Power Systems in Dallas became the second American firm to take home the 44-year-old prize.

Satya Sherma, Ph.D., directed AT&T's quality effort. We met on a recent cross-country flight, and he graciously granted me an interview — though he really had no choice, since the five-hour flight was full and he was sitting next to me.

Sherma, who recently took a new position as the senior vice president of quality at Symbol Technologies, has left quite a legacy at AT&T.

Today, visitors come from all over the world to observe operations at AT&T Power Systems. What interested me were not operations, but whether the methodology he used to achieve total quality would be appropriate to client/server application development projects.

Marc Myers

He used two methods to achieve success that I found applicable to software development. The first one he calls the Quality Improvement Story (QIS).

This is a simple technique where each quality improvement made by the staff was saved as a story. Each story presented the technical problem that occurred, the situations where the problem occurred, the analysis made and the actions taken. These stories were then given to future implementers, which Sherma said "assured that the gains, once achieved, would be retained in the business."

QIS is also an appropriate method for storing technical solutions to software development problems, far superior to the frequently-asked-question documents on CompuServe and the 'Net.

The second relevant technique employed by Sherma is what he calls the Boka/yoke approach to quality. Boka/yoke is a Japanese word that roughly translates to "mistake proofing."

The theory here is that everybody makes mistakes. The challenge is to make sure that the errors do not become defects. Sherma developed three levels of Boka/yoke:

■ **Level 1** — Catch the error before it creates a defect.
■ **Level 2** — Catch the error in the process of creating a defect.
■ **Level 3** — Catch the error after the defect has been created but before it goes any further.

Boka/yoke can be applied to software development, too. To catch errors before

defects are ever allowed to manifest themselves requires a sophisticated editor to analyze your code as you type it in. Most of the new GUI-based program editors are starting to employ this technique. Level 2 Boka/yoke is usually handled by compilers, which are depended on to catch errors after they are created but before

they get into the binary code. And at the Level 3, we have code debuggers, along with programmers' common sense. The challenge is to make improvements at all three levels.
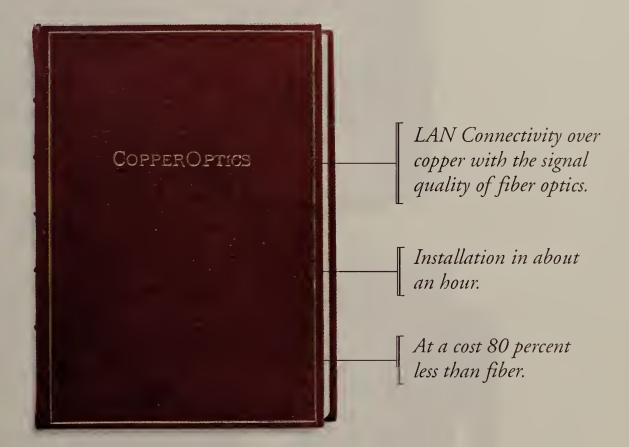
At AT&T, Sherma and his team realized the following achievements: Design cycle time was reduced by 50%, product costs went down by 30%, and manufacturing cycle time improved by 90%.

Sherma's current goal is to make Symbol Technologies another world-class quality story using the techniques devel-

oped at AT&T. "We would like to use the same approach here to create a technology powerhouse going forward. Quality processes provide a true competitive advantage."

Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726. Myers' column alternates in this space with that of META Group, Inc.'s Mike Rothman.

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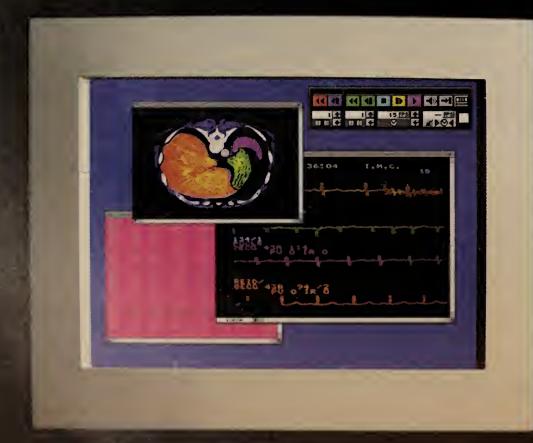
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and Doing Business On-Line

Briefs

■ *Wilton, Conn.-based research consultancy SIMBA Information, Inc. predicted* **on-line sales will reach $24.1 billion** *by 1999, up from $13.8 billion in 1994. SIMBA said the proliferation of PCs and the popularity of the World-Wide Web will account for the lion's share of the growth.*

■ **U.S. Secretary of Commerce Ronald Brown,** *chairman of the National Information Infrastructure (NII) task force, last week released a report that said changes in copyright law are needed in order to protect copyrighted works in an electronic medium.*

Brown

The report, **"Intellectual Property and the NII,"** *recommends that the current Copyright Act be amended to recognize that published works, including phonographic records, can be distributed by electronic transmission and that the transmissions fall within the exclusive distribution rights of the copyright owner.*

The report, however, says the fair-use library exemptions to copyright law should also be amended to allow libraries to make three copies of works in digital format and to authorize the making of a limited number of digital copies by libraries and archives for preservation purposes. The report also recommends that the Copyright Act be amended to prohibit the importing, manufacturing or distribution of any device designed to deactivate technical protections for copyrights.

■ **Harbinger Corp.** *has acquired the* **AS/400 Electronic Data Interchange** *product line of System Software Associates, Inc. and its development organization in the Netherlands. Harbinger adds the AS/400 EDI product to its existing EDI product line for MVS, Unix and Windows.*

Utah first to carve out digital signature rules

By Ellen Messmer
Salt Lake City

Utah has become the first state to set down legal ground rules for using digital signature technology in electronic commerce. The state passed the Digital Signature Act, which took effect in May.

With digital signatures, users can sign documents electronically with a private encryption key before transmitting them. Recipients can then check the authenticity of the signature and the document's content with the sender's public key to ensure it was not tampered with.

In an attempt to link the signature user's identity with a particular public key that is then openly published, a host of certificate authorities (CA), ranging from Apple Computer, Inc. to start-up TradeWave Corp., are springing up. These CAs step in to issue software certificates tying the user's name to a public key.

But no government agency in the U.S. had tackled the legal questions raised by digital signatures, such as liability for use, until the Utah state legislature passed the Digital Signature Act.

The act creates a voluntary system of cybernotaries that will have to carefully check the identity of the digital signature user. Any certificate issued with the user's consent must be published in a public repository for electronic commerce use.

Dual accountability

Alan Asay, attorney with the Utah Office of the Courts who was instrumental in crafting the new Utah law, said the Digital Signature Act spells out the legal responsibilities for both the CA and the digital signature user.

"The CA will be liable for making a bad identification," Asay said. In turn, the subscriber cannot lie to the CA, and if he is negligent with his private key, the subscriber will be held liable for losses from forgeries.

Also, signature subscribers must notify the CA to have a signature suspended or revoked if the software signature appears to be lost or stolen.

The act sets up four categories of monetary risk exposure requiring CAs to have surety bonds or a letter of credit to cover the maximum risk the law expects them to accept in issuing a certificate to a digital signature subscriber.

CAs are not required to pass the Utah inspection system in order to operate as certification registrars, but if they do, they are covered by the ground rules spelled out in the Utah law.

If CAs decide not to operate as Utah-registered authorities, they will have to depend on common law to bail them out in any disputes.

For the digital signature users, the same rule applies. Businesses will not have to use a registered CA, but if they don't, Utah state law will not presume the digital signature is valid.

"If you opt into the law, you're protected by it," Asay said. "If you don't, the benefits of the act don't apply."

Utah is now seeking to sponsor a X.509 certificate database repository to hold public-key certificates, but it is not yet final

EXAMPLE OF DIGITALLY SIGNED MESSAGE

<Signed SigID=1>

Promissory note

I, Mary Smith, promise to pay to the order of First Western Bank five thousand dollars and no cents ($5,000) on or before June 10, 1998, with interest at the rate of fifteen percent (%15) per annum.

Mary Smith, Maker

</Signed>

<Signature . . SigID=1   PsnID=smith082>
2AB3764578CC18946A29870F40198B240CD23
02B2349802DB002342B212990BA5330249C1D
20774C1622D39</Signature>

The digital signature represented in cyphertext attached to the end of the message contains the message hash, a unique code of the contents.

whether the state or a private sector organization will control its operation. Private sector firms such as Netscape Communications, Inc., VeriSign, Inc. and The Dun & Bradsteet Corp. have expressed interest in operating the X.509 certificate directory, Asay said.

Utah expects to be up and running with the X.509 directory in six months, but the state does not intend to operate in a vacuum, he emphasized.

"There are about a dozen states that are considering or have introduced legislation that falls along Utah's lines," Asay said. An American Bar Association task force intends to soon release what it calls a Model Digital Signature Law that it hopes will be considered for state and federal laws of this kind, he said.

The concept has global appeal, pointed out Toh See Kiat, an attorney with Singapore law firm Arthur Loke & Partners.

"For the last month, we have had the 'electronic court' in Singapore where we can file papers via E-mail on a packet network we call Law Net," Toh said. "Even inside the court, you're now allowed to present the evidence on computer."

But these electronic court filings still require a hard copy of the document to be submitted as backup proof since every court document requires a signature. ■

Federal agencies told to preserve business E-mail

By Ellen Messmer
Washington, D.C.

By the end of this month, employees at federal agencies will have to start storing business-related electronic mail so it can be preserved for the record like other government documents.

Under new rules promulgated by the National Archives and Records Administration, agencies will have to preserve business E-mail, either by installing automated record-keeping systems or having users print out items so they can be saved for delivery to the National Archives.

The government was compelled to issue the E-mail rules after recently losing a round in the case known as Armstrong v. The Executive Office of the President. In that case, National Security Archives employee Scott Armstrong and others sued in 1989 to prohibit destruction of White House E-mail.

Michael Tankersley, the lawyer spearheading the lawsuit to get the government to preserve E-mail, predicted that the Armstrong case and the ensuing E-mail regulation will eventually impact the commercial sector, as well.

DOING BUSINESS WITH ELECTRONIC MAIL

By Sept. 27, federal agencies must:

▶ Determine an appropriate E-mail records maintenance program so important E-mail documents can be automatically stored or printed out.

▶ Train users to tell the difference between an E-mail "document" of business or historical value and a "nondocument."

▶ Ensure stored E-mail documents include, at a minimum, the sender and addressee names and the message date.

▶ Ask E-mail users to request electronic acknowledgments and requests for receipts to aid record-keeping.

▶ Specify which officials are responsible for electronic records maintenance and which computer systems are used for record-keeping.

SOURCE: THE NATIONAL ARCHIVES AND RECORDS ADMINISTRATION, WASHINGTON, D.C.

"Corporations and private businesses now have a large sea of documentation created electronically, and they are not managing it," Tankersley said. "There are serious legal issues involved in that."

The U.S. government frequently employs private companies to do many of the daily tasks of federal agencies, and it is possible that federal contractors may have to conform to the new E-mail rules eventually.

But automated E-mail records storage has not been a chief concern for companies in the private sector either, said Gary Rowe, principal at Cincinnati, Ohio-based consultancy Rapport Communication.

"In the existing E-mail environment, you'd have to set up rules on the server level to accommodate several E-mail systems," Rowe said, adding there is no uniform way to do this at present.

Because few electronic record-keeping systems for E-mail exist, federal managers say they will have to ask users to back

Virtual diseases and virtual cures

Ladies and gentlemen, I have discovered a whole new field of medicine. I will call this field "Netology."

As the world's leading (and only) Netologist, I have identified a number of serious diseases that you need to be aware of.

The first of these is Punditaphobia. This is a severe reaction to predictions and forecasts about the growth rate of on-line activities.

For example, you may hear one of the hacks at (Name deleted — sorry, but we don't need the lawsuit. Ed.) suggest that within the next 22 days, give or take a year, every man, woman, child and most domestic appliances on earth will each run two or more Web sites. If this happens and you feel an unstoppable urge to burst into hysterics, you are suffering from the dreaded Punditaphobia.

The only known cure for Punditaphobia is to restrict your reading to *Network World* (Good call. Ed.) and, specifically, this column (Mark, we'll probably cut this for space. Ed.).

The next affliction is Stackne. This disfiguring ailment is the result of trying to find a TCP/IP stack that will coexist with NetWare, VINES, Windows for NotWorkgroups and the billion drivers that run under your Windows system.

The diagnostic signs are copies of just about every Internet application suite vendor's product in your office and a ridiculous number of DLLs in windows\system.

Another indication is finding yourself muttering under your breath: "someone, somewhere must have created a stack that has a decent dialer and also works with Ethernet."

Unless treated quickly, these pustulent DLLs and product packages will expand until all available disk space and office floor space are used up.

Newsitosis is a very antisocial problem but, thankfully, one that is easily cured. Sufferers find themselves unable to go for more than 24 hours without reading the newsgroups to which they've subscribed. They develop a standard denial pattern: "I need to keep up with alt.dishwashers and rec.socks.performance.tuning in case something really important to my company is discussed."

This disease is very easily cured. Simply restrict the available newsgroups to alt.adjective.noun.verb.verb and rec.woodworking.glue. After six or seven days, victims will start to lead a more or less normal life.

While the foregoing diseases are unpleasant enough, there is something far worse: URL Altzheimer's.

Those who suffer from URLA exhibit very sad behavior that is very stressful on their family, friends and workmates: They can't remember where they've browsed.

URLA sufferers repeatedly visit the same sites and only rarely recognize them. Part of their problem is that they have bookmark lists that rival *War and Peace* for length.

Indeed, having a bookmark file that is more than 100K in size is a primary symptom of URLA.

"What can be done for these poor creatures?" you may ask. Well, one of the first steps in treatment is to ensure that they keep their browsing down to a reasonable number of hours per day; say, something less than 15.

But be careful! If not treated, URLA suffers are frequently found staring glassy-eyed at their monitor at about 5 a.m., endlessly jumping between the Jolt Cola and Pizza Hut sites.

As caring 'Net citizens, I'm sure you'll all want to help victims of these crippling and disfiguring ailments. Give generously and give today to The Gibbs Information Overload Research Center.

So dig deep in those pockets and remember, any of these diseases could strike you down tomorrow. Without a cure, you could become just another piece of human flotsam drifting around the on-line ocean.

Gibbs is a writer and consultant based in Ventura, Calif., whose septic tank is still out of service. Contact him with your on-line ailment at mgibbs@gibbs.com or at (800) 622-1108, Ext. 504.

Archive

up business E-mail by simply printing it out.

"The E-mail should be migrated to an appropriate system, whether electronic or paper," said Jason Baron, attorney at the Department of Justice. Agencies will need to start storing message transmission and receipt data, as well as part of the record, he added.

Electronic storage of E-mail is preferable, but National Archives stopped short from making this a requirement due to the cost of building customized storage systems, Baron said.

Mark Miller, the Environmental Protection Agency's national program manager for records management, said the EPA uses 10 different types of E-mail in addition to Lotus Notes.

Lotus Notes presents a way to back up messages for archiving, but most E-mail systems do not, Miller said. While the agency would prefer to store E-mail electronically to conform with the new rules, the EPA does not plan a wholesale conversion to electronic record-keeping since few commercial E-mail products for this exist, he said.

Whatever course agencies take, the new E-mail rules require agency managers to train users about how to handle important E-mail.

The new E-mail rules require agency managers to train users about how to handle important E-mail.

The proliferation of desktop PCs has led to the circumvention of secretarial support staff as the traditional central point for collecting documents, so individual users need to be informed about their role in archiving, said Sue Elter, appraisal architect at the National Archives office of records management.

"We have developed a two-page set of responsibilities for users so they can decide if E-mail is a record," Miller said. "We'll have to make sure that all the message transmissions are printed out."

Few agencies, with the notable exception of the White House, currently archive E-mail electronically, Miller added. ■

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CAPITALIZING

ON THE

INTERNET

Demolition Man

Jim Griffin has sparked a rock 'n roll revolution at Geffen Records, knocking down old business practices to win the company a starring role in Web-based electronic commerce. Page 6.

September 1995

http://www.geffen.com/

Welcome

at dog.

Teenage Fanclub

White Zombie | That Dog | Teenage Fanclub

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Geffen/DGC Artists

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Links Into Cyberspace

This site is optimized for Netscape browsers.
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CONTENTS

Network World's
capitalizing on the Internet

Volume 1, Number 1

Cover photo illustration by Yves Courbet
Capitalizing on the Internet design format by Dwayne Flinchum

FROM THE EDITOR

The Internet. It's on everyone's lips and minds these days, as pundits, politicians and partisans debate the 'Net's impact on society.

No such navel-gazing here. This supplement is squarely focused on one issue and one issue only: what you can do to help your company prepare to profit from the Internet. We look at the technologies, the marketing issues, the challenges and, most important, the people and companies that have already taken their businesses on line.

Over the past year, we've dealt with the challenges of bringing our own business on line and we hope you'll be pleased with the outcome. Our World-Wide Web service, Network World Fusion, goes live in two weeks. It will provide readers with a wealth of information complementing the stories you read in the print edition of *Network World* - virtual stories and columns, a forum for sharing your thoughts with columnists, NW staffers and other readers, links to resources on the network, financial information and more. (Look for more information in the September 25 issue of Network World.)
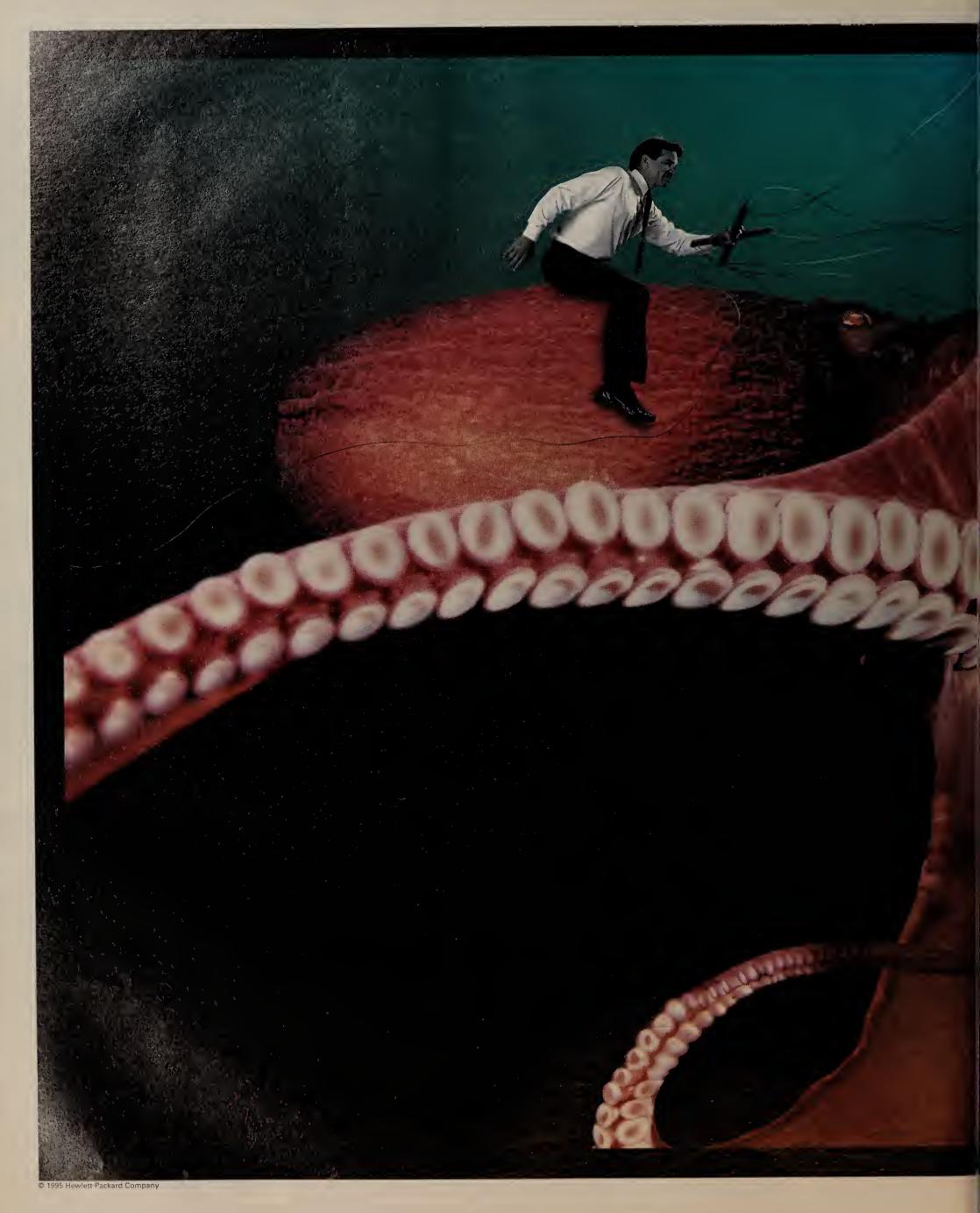
Included in these services will be an updated listing of many of the Web site addresses provided in the articles in this supplement.

Electronic publishing gives us another tool to achieve our goal: to be the best source of information - in whatever format - on enterprise networking.
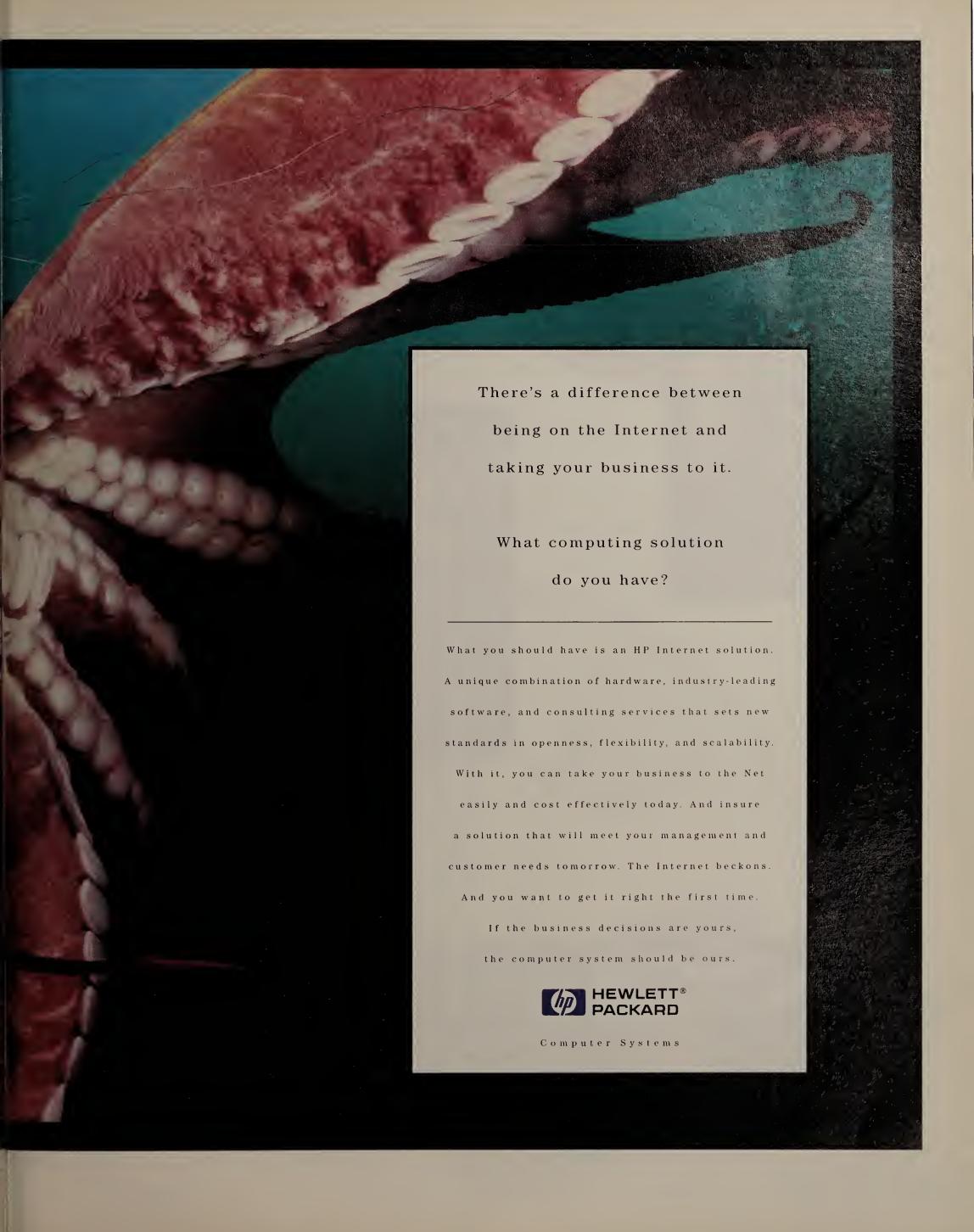
Electronic commerce will transform business in the years to come and it's your job to lead the way within your companies. Let us know how we can help you. Drop a note with your reactions to this issue and to Network World Fusion, and give us your thoughts on future stories.

- John Gallant, editor-in-chief. jgallant@nww.com

For more information on our Internet solution: **1-800 HP KNOWS** or **http://www.hp.com/go/internet**

The running

By Dan Dern

JIM LENNON

DONNA IUCOLANO
Marketing Coordinator, Interactive Services
1-800-FLOWERS

Iucolano says this retailer is doing quite
nicely, thank you, when it comes
to selling on-line.

CINDY CHARLES

JEAN SCHROETER
Owner
Future Fantasy Bookstore

The Web erases geographic bound-
aries and, says Schroeter, opens
your doors to customers you would
never have found otherwise.

JON MUREESAN
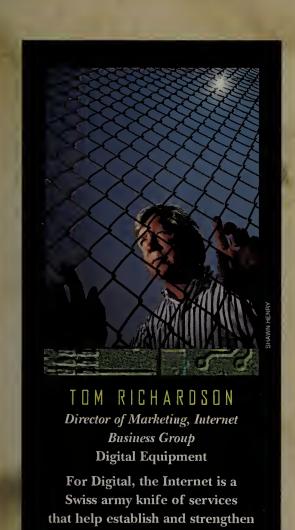
JON ZEEFF
President
Branch Internet Services

Zeeff knows the Internet can give even
the smallest company a global presence.
But are you ready to handle that?

dogs of net.

capitalism

TOM RICHARDSON

Director of Marketing, Internet Business Group
Digital Equipment

For Digital, the Internet is a Swiss army knife of services that help establish and strengthen customer relationships.

These pioneering cyber-sellers are proving that not all that information superhighway stuff is hype.

Cocktail party chatter, circa 1995.

"So you say I should be using the Internet for my business?"
"You bet."
"I thought that wasn't permitted?"
"T'ain't so."
"Are there fortunes to be made on that information superhighway?"
"Don't count on it, unless you're the lucky owner of one of those Internet companies being bought for tens of millions of dollars."
"Can I make any money on the Internet?"
"Maybe. Maybe not."
"Then why should I bother?"
"Did you ask this before deciding whether to get phone lines and fax machines?"
"Of course not, I can't run my business without them!"
"There you go."

Along with getting-on-the-Web-mania, making money on the Internet ranks high on the wish lists of many people these days.

But is there money to be made — other than by being acquired by a company like America OnLine, Inc. or CompuServe, Inc.? Does the Internet represent a new market with new customers for your products and services? Is it another way for you to reach existing customers or your competition's customers?

The answer, depending on your unique business situation, is: A) Yes; B) No; C) It's not clear; D) Who the heck knows?; E) All of the above; and F) We dunno, but let us buy 60% of you for $23 million.

What is clear is that many companies are already successfully selling on the Internet — generating orders, taking orders, even taking money.

In its spring 1995 market research study "Who's Succeeding on the Internet and How?," ActivMedia, Inc. of Peterborough, N.H., pegged sales generated by the World-Wide Web at $118 million for the period between September 1994 and August 1995. (See http://www.activmedia.com or call (603) 924-9100 for more information.)

According to Jeanne Dietsch, vice president of ActivMedia, "twenty-one percent of survey respondents had sales of $10,000 or more during the previous month. Three percent had sales greater than $100,000."

What's also clear from ActivMedia's research is that many marketers are new to Internet selling: Companies surveyed had an Internet presence for an average of only seven months.

ActivMedia's hundred million or so dollars is a nice number, but this figure probably represents only a fraction of the current Internet business reality. For example, Digital Equipment Corp. alone has been racking up $150 million annually in Internet-enabled sales, according to one company spokesperson. Digital wasn't included in the ActivMedia survey, and the company's Internet revenue figure includes income from non-Web venues (see "Digital goes Internet," page 8).

For the Comdex/Spring 1995 event in Atlanta, the show's Web site logged

2,000 or more registrations per week, ranging from free exhibit registrations to full conference registrations valued at close to $1,000. Other leading technology events now being pitched on the Web include SoftBank Exposition and Conference Co.'s NetWorld+Interop (http://www.interop.net), Bruno Blenheim, Inc.'s PC EXPO, and Internet shows from Digital Consulting, Inc. of Andover, Mass., and MecklerMedia Corp. of Westport, Conn.

During the 1995 Mother's Day season, 1-800-FLOWERS racked up 600 sales through a new Web site. While that's only 1% of the company's total online sales, Donna Iucolano, marketing coordinator for the company's Interactive Services, called the volume significant, especially given how much they'd read about "other people who weren't getting many orders."

For other companies, the sales volume is even more significant. For example, a sales manager at InterCon Systems Corp. said that close to a third of the company's sales had come via the Internet, including downloads of software. (InterCon was recently purchased by Internet services provider Performance Systems International, Inc., by the way.)

Thousands of companies have established Internet presences to hawk their hard- and softwares. As of July 1, 1995, the Commercial Sites Index maintained by Open Market, Inc. (http://www.directory.net) had nearly 9,000 entries.

That the Internet has become a key communications resource for the business world is long past debate. We're still learning how to do business well, but the numbers are indisputable. Thousands of companies are plugging in to give their employees access to the Internet or establish at least minimal "here-we-are" Web presences.

Tens of thousands of entrepreneurs have gotten their own Internet accounts and/or Web pages; hundreds, perhaps thousands, of employees who have been unwilling to wait for their companies to officially hop on the Web have also put up unofficial Web presences for their employers.

What should you do? What shouldn't you do? Let's take a look.

The Internet: open for business

Although doing business on the Internet is a relatively recent phenomenon, one can make a case that the Internet has been used for business from the very first days of the ARPANet a quarter century ago.

The purpose of the ARPANet and its descendants — most of which constitute the Internet today — was to help people get their jobs done, and that's certainly a form of business. That initially meant helping in actual work: accessing remote computers, exchanging files, having work-related electronic mail discussions, sharing meeting and conference announcements, and the like.

It probably wasn't long after the ARPANet carried its first E-mail message that the network also began to carry administrative paperwork, such as proposals, informal and formal requests for equipment, invoices, purchase orders, inventory updates — all in support of getting the job done.

It's not a big stretch from using the network to get the job done to using it to do business — buying, selling and delivering products.

If your business sells computer-related products or services, "the Internet is a great place to communicate with your customers. It is cheap, efficient and timely," says Robert Raisch, president of The Internet Co. in Cambridge, Mass., one of the oldest established Internet presence providers.

"The real success stories — [O'Reilly & Associates, Inc.'s] Global Network Navigator, *Wired* magazine's HotWired, SoftBank's Comdex Online — are speaking to those who use the global Internet — in other words, computer users," Raisch says.

Raisch's company was responsible for bringing the Comdex conference and exhibition on-line (http://www.comdex.com:8000), allowing prospective attendees to preview the program and exhibitors, and pre-register for the event.

But, Raisch cautions, "if your business involves a consumer-oriented product or service, you may mistakenly see the global Internet as a cheap, easy way of marketing without understanding that marketing is never easy or cheap."

Sell, sell, sell

That theme is echoed by Joel Maloff (joel@maloff.com), president of The Maloff Co., an Internet consultancy in Dexter, Mich., who says that success is contingent on developing a comprehensive marketing plan.

"There are companies selling quite extensively. I've personally sold thousands of dollars of reports, with transactions completed through the 'Net," Maloff says. He works with customers in a variety of ways, ranging from having them send credit card numbers via E-mail to having them speak to a telephone representative.

"We've gotten over 3,000 orders this past year via the Internet, based on having information on the Web," says Jean Schroeter, owner of Future Fantasy

Bookstore (http://futfan.com/). The Palo Alto, Calif., bookstore specializes in science fiction, fantasy and mystery books, as well as associated merchandise, such as audiotapes, T-shirts, crafts and gargoyle minireplicas.

By accessing the bookstore's Web area, Internet users can browse an on-line catalog, place orders, read the store's newsletter (which cleverly links

Digital goes Internet

At Digital Equipment Corp., no one doubts that the Internet is a valuable sales and marketing tool.

Digital makes product information available globally, putting tens of thousands of documents and files up on its World-Wide Web and FTP servers. The company has almost 250 Web servers supporting internal applications, according to Tom Richardson, director of marketing in Digital's Internet Business Group in Littleton, Mass.

"We use the Internet to send software patches. We use Usenet newsgroups, and we own — meaning we control what gets posted to them — about half a dozen [newsgroups] such as biz.dec.announce," Richardson says. "DECUS, the Digital user's group, has its own newsgroup, as well."

For its Alpha product line, Digital made innovative use of one of the Internet's oldest utilities, telnet, encouraging up to 500 Internet users per day to try new Alpha-based computers via remote logon to sites such as axposf.pa.dec.com.

All these uses of the Internet translate into more and better business. It's impossible to estimate the indirect benefit to Digital's sales, or the savings in marketing, sales and support activities, although they're clearly significant.

There is at least one number available, though, and it's a biggie: "We did $150 million [in sales] via the Internet this past fiscal year," Richardson says.

Richardson says would-be Internet marketers need to think carefully about their business objectives and set their expectations accordingly. "Know who your audience is and what they're going to do," he advises.

"Today, it's mostly people who already know what they want to buy and are simply looking for the information or a place to purchase what they need," Richardson adds. "As you build your site, think about who's there, what they need to do and what they want to do."

For a complete list of Digital-related Internet sites and services, and how to access them, send electronic mail to info@digital.com (no subject or message body needed).

TCP/IP-to-SNA Integration

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author and title mentions to the on-line catalog), get directions and a map to the store, and link to other science fiction stores and sites on the Internet.

"It's a great way to get customers we might never have gotten, and for customers who might not have access to books and bookstores like ours where they live," Schroeter says.

It's a mall, mall world

One inevitable follow-on to individual Internet storefronts has been the concept of Internet malls, which serve Internauts who want to go shopping without a specific company or destination in mind. An Internet mall offers such prospective customers a first port of call, from which they can explore a variety of stores.

Internet presence providers offer packages of services for customers setting up shop in their malls that may include handling orders and transactions, as well as mounting product information and managing the Web site.

Like malls in the real world, some Internet malls have prospered and some have not. One, Cybermall, closed its virtual doors a while back. Open Market, Inc., one of the first companies offering to build and host Internet store presences for companies, was unable to garner enough paying customers in its first year, so it shifted to a product-oriented focus — developing and selling Internet

commerce servers.

Another net failure was the first incarnation of MecklerMedia's MecklerWeb, originally envisioned as a high-concept place where the Fortune 100 could foster "domains of content." But when only one paying customer had signed up after six months of development, the site had its plug yanked within days of going up and was subsequently repositioned with a more modest goal, promoting MecklerMedia's own products.

On the other hand, Branch Internet Services, Inc.'s Branch Mall (http://branch.com/), the first Web mall, is still in business, with 130 or so retail clients as well as other storefronts in a parallel Branch Business Center area. A basic presence can cost as little as $2,000 per year, with a major corporate presence costing $100,000 to $200,000.

"Two thousand dollars a year is low enough that most companies can afford it simply for visibility, without being concerned about generating revenue," says Jon Zeeff (jon@branch.com), president of Branch Internet Services. "And if you're a major company, a few hundred thousand dollars is probably only a fraction of your total advertising budget."

Small gift retailers are reporting sales of hundreds of dollars per week, estimates Zeeff — enough to justify continuing the experiment if nothing else.

As of early July 1995, Branch Business Center customer Network Express, Inc. reported that the Internet brought in about 5% of sales of its ISDN products, which cost $10,000 or more. Over the summer, the company planned to set up a separate Web site and negotiate for pointers between the independent and mall sites, and to ISDN information elsewhere on the Internet.

Why an individual site? "Because we're now more familiar with Internet technology and [we want] to establish a direct presence on the Internet," states Wendy Wytyshyn, manager of marketing communications at Network Express.

Taking advantage of the Internet

As companies like Network Express demonstrate, the learning curve for the Internet is so sharp you can almost feel it and the changes come so fast you can all but hear the cybersonic boom.

"I don't think most companies have thought through exactly how the Internet will play into their corporate strategies. But they sense it's a big issue and that they need to start experimenting," says Jeff Kvaal, senior consultant in Ernst & Young's MultiMedia Services Group.

"From a retail and wholesale perspective — for any consumer products — the Internet will be a wonderful opportunity to eliminate costs and lower retail prices," suggests John Bly, international director of retail and wholesale consulting for AT&T.

Within the next decade, he predicts, on-line ordering — via such means as computer and television — will account for some 20% of the retail market.

"It's important to know why you're doing this, whether it makes sense," Zeeff states. "Your information can be seen globally, but is it widely relevant? Can your product or service be shipped or given to people everywhere?"
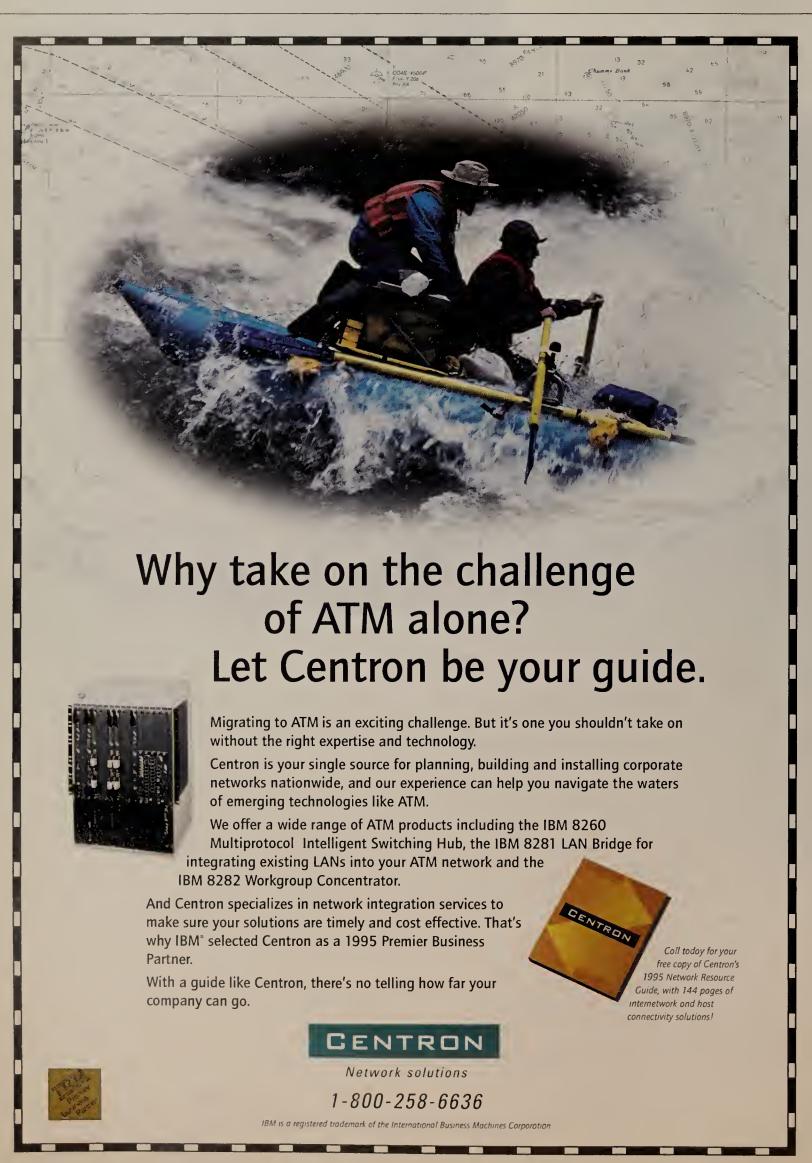
Case in point: One Branch Service client, AllWeather, Inc., sells pool alarms within the U.S. But it got a $40,000 order from a distributor in the Netherlands thanks to its Internet presence.

It's also important to know what you're trying to accomplish, he adds. For example, not all of his clients are trying to sell on-line. Some use the Internet simply as a lead-generation tool that enables them to collect information that shapes follow-up sales efforts.

Whether to join a mall or have a stand-alone presence depends on the size and nature of your company. If you're a well-known company such as Apple Computer, Inc., IBM or Microsoft Corp., people are likely to find you on the Internet. But for smaller and more specialized companies, being part of a mall may get you in contact with customers who might otherwise not find you.

For would-be on-line mall partici-

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pants. "Ask about technical capabilities, like connection speed, reliability, whether they offer secure servers," Zeeff suggests. "Can orders be forwarded to you by fax or courier as well as E-mail?"

Other advice

Ask what the provider does to enhance mall visibility. Does the company advertise and promote? What types of links do they arrange for? And do they support other non-Web Internet access methods, like Gopher and E-mail?

Be sure to compare costs based on what's offered. One client got bids ranging between $10,000 and $70,000 for the same level of service.

If you do join an Internet mall, give it time to work. Branch Service's standard contract is for one year because participants may need that much time for their

Web shops to show results.

And don't think that once you've put up your Web page or any other Internet presence that your job is done, cautions Glee Cady, manager of information services with Netcom On-Line Com-munications Services, Inc. and coauthor of *Mastering the Internet.* (Sybex, 1995). "Putting it on the Internet is the easy part; keeping it there is the hard part."

By keeping it there, Cady is referring

to the need to keep your information fresh and useful. "Somebody has to maintain and update content, including removing obsolete items. Somebody has to respond responsibly to all messages. And somebody has to make sure that all the parts of your presence — Web pages and pointers, Gopher menus, etc. — are still working," Cady says. "If you're doing customer service via the Internet, you have to make sure that your customer service representatives are trained in using the Internet.

This is the year that advertisers discovered the Web and tried to use it as if it were a blend of the best features of print and broadcast media.

So, "what's your content loss leader?" asks Larry Chase, president of The Online Advertising Agency (http://www.advert.com) and creator of the "Web Digest for Marketers," a biweekly on-line bulletin that reports on new marketing and marketing-related Web sites.

"You're competing with tens of thousands of sites for attention and your potential viewers have only limited time they can spend browsing the Internet each week. You need a loss leader, something that's of value that you're willing to make available for free to visitors to bring them in," Chase says.

His advice: "Focus on a target group. Figure out what information is valuable to that group that they'd otherwise pay for, and use that to bring them in."

Bringing them in is one challenge. But "you also have to tell them it exists," Chase adds. "Do that by cross-linking your site with affinity partners and with appropriate activity in Usenet. Also step outside the Internet for awareness-building: Go cross-technology with tune-in ads on radio, print and other media."

Once you've managed to attract users to your site, what will encourage them to check out what's there? In other words, what makes a good Web site?

"Mercifully short-loading graphics," Chase says, along with a natural pathway to the information a user's seeking. "Companies often present their Web site as `Here's a top-down look at our company: our mission, our business units and, eventually, here's our products.' It should be the other way around: `Here's tangible information about our products, and you can look here for more about our company if you care.'

Chase also recommends making the site as easy to use as possible. "Put a search engine — some way to easily search within your information — right at the top." ✱

Dern (ddern@world.std.com) has been using, writing and speaking about the Internet for over a decade. He is also the author of The Internet Guide for New Users *(McGraw-Hill). Check out his Web site at http://www.dern.com:2205.*

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1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs, Distributors)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)*_____

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, Systems Management
5. ☐ Engineering Management
6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)*_____

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

5 Check ALL that apply in Columns A and B:
A. I am involved in the purchase of the following products/services;
B. I plan to purchase the following products/services:

A   B
☐ 100 ☐ **LOCAL-AREA NETWORKS**
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ Network Op. Sys. Software
☐ 03. ☐ LAN Storage/Backup
☐ 04. ☐ Optical LAN Storage/Backup
☐ 05. ☐ Disk LAN Storage/Backup
☐ 06. ☐ Tape LAN Storage/Backup
☐ 07. ☐ RAID LAN Storage/Backup
☐ 08. ☐ Network Test/Diagnostic Tools
☐ 09. ☐ Cables, Connectors, Baluns
☐ 10. ☐ UPS
☐ 11. ☐ Network Interface Cards
☐ 12. ☐ Peer-to-Peer LANs
☐ 13. ☐ SNMP Network Management
☐ 14. ☐ ATM Switches
☐ 15. ☐ Token-Ring Switches
☐ 16. ☐ Ethernet Switches
☐ 17. ☐ Remote LAN Access/Communications Servers
☐ 18. ☐ Superservers
☐ 19. ☐ File/Application Servers
☐ 20. ☐ Print Servers

A   B
☐ 101 ☐ **INTERNETWORKING**
☐ 21. ☐ Bridges
☐ 22. ☐ Routers
☐ 23. ☐ Bridge/Router
☐ 24. ☐ Gateways
☐ 25. ☐ Intelligent Hubs/Stackables

A   B
☐ 102 ☐ **COMPUTERS/PERIPHERALS**
☐ 26. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 27. ☐ Micros/PCs
☐ 28. ☐ Minis
☐ 29. ☐ Mainframes
☐ 30. ☐ Workstations
☐ 31. ☐ Terminals
☐ 32. ☐ Printers
☐ 33. ☐ Cluster Controllers
☐ 34. ☐ Monitors
☐ 35. ☐ Fax/Modem Boards

A   B
☐ 103 ☐ **REMOTE/WIRELESS COMPUTING**
☐ 36. ☐ PDAs
☐ 37. ☐ PCMCIA Devices
☐ 38. ☐ Wireless Data Services
☐ 39. ☐ Wireless Data Equipment
☐ 40. ☐ Wireless LANs
☐ 41. ☐ Cellular Equipment & Services

A   B
☐ 104 ☐ **INTERNET/ELECTRONIC COMMERCE**
☐ 42. ☐ Internet Access Providers
☐ 43. ☐ Firewalls
☐ 44. ☐ Web Servers/Browsers
☐ 45. ☐ Internet Software Tools

A   B
☐ 105 ☐ **SOFTWARE/APPLICATIONS**
☐ 46. ☐ Network Management
☐ 47. ☐ Systems Management
☐ 48. ☐ Security
☐ 49. ☐ Communications Software
☐ 50. ☐ Terminal Emulation
☐ 51. ☐ Word Processing
☐ 52. ☐ Operating Systems
☐ 53. ☐ Client/Server Applications Development
☐ 54. ☐ Database Management/RDBMS
☐ 55. ☐ Spreadsheet
☐ 56. ☐ Groupware
☐ 57. ☐ EDI
☐ 58. ☐ E-mail
☐ 59. ☐ Windows/Graphical User Interface
☐ 60. ☐ Multimedia
☐ 61. ☐ Graphics/DTP
☐ 62. ☐ Remote Access
☐ 63. ☐ Imaging
☐ 64. ☐ Suites
☐ 65. ☐ Middleware
☐ 66. ☐ Document Management
☐ 67. ☐ Database Server
☐ 68. ☐ Site Metering Tools
☐ 69. ☐ Computer-Integrated Telephony (CIT)

A   B
☐ 106 ☐ **WIDE-AREA NETWORK EQUIPMENT & SERVICES**
☐ 70. ☐ Frame Relay Equip./Services
☐ 71. ☐ Modems
☐ 72. ☐ FT-1/T-1/T-3 Multiplexers
☐ 73. ☐ FT-1/T-1/T-3 Services
☐ 74. ☐ SONET
☐ 75. ☐ Inverse Multiplexers
☐ 76. ☐ SMDS
☐ 77. ☐ Asynchronous Transfer Mode
☐ 78. ☐ Diagnostic/Test Equipment
☐ 79. ☐ DSU/CSU
☐ 80. ☐ VSAT/Satellite
☐ 81. ☐ ISDN Equipment & Services
☐ 82. ☐ PBXs
☐ 83. ☐ Voice Mail/Response
☐ 84. ☐ Videoconferencing
☐ 85. ☐ Leased Lines
☐ 86. ☐ Switched Data
☐ 87. ☐ E-mail/On-line Services
☐ 88. ☐ 800/900/MTS Services
☐ 89. ☐ Virtual Networks
☐ 90. ☐ Outsourcing/Systems Integration Services
☐ 91. ☐ Education/Training Services

☐ 92. ☐ None of the above (1-91)

6 What is the total number of LANs, workstations/nodes at this location/ in your organization?

At this location:		Entire organization:	
LANs	Workstations/Nodes	LANs	Workstations/Nodes
1. ☐ 5;000+	☐	1. ☐ 5,000+	☐
2. ☐ 1,000 - 4,999	☐	2. ☐ 1,000 - 4,999	☐
3. ☐ 100 - 999	☐	3. ☐ 100 - 999	☐
4. ☐ 50 - 99	☐	4. ☐ 50 - 99	☐
5. ☐ 10 - 49	☐	5. ☐ 10 - 49	☐
6. ☐ 1 - 9	☐	6. ☐ 1 - 9	☐

7 Check ALL that apply in Columns A and B:
A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

A   B
☐ 55 ☐ **NETWORK ARCHITECTURES**
☐ 01. ☐ SNA
☐ 02. ☐ DECnet
☐ 03. ☐ TCP/IP
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ AppleTalk
☐ 08. ☐ NFS
☐ 09. ☐ Other *(please specify)*_____

A   B
☐ 56 ☐ **NETWORK OPERATING SYSTEM**
☐ 10. ☐ Microsoft (LAN Manager)
☐ 11. ☐ Novell (NetWare 2.X, 3.X)
☐ 12. ☐ Novell (NetWare 4.X)
☐ 13. ☐ Windows NT
☐ 14. ☐ Windows NT/Advanced Server
☐ 15. ☐ LocalTalk (AppleTalk)
☐ 16. ☐ Banyan (VINES)
☐ 17. ☐ IBM (LAN Server)
☐ 18. ☐ IBM (PC LAN Program)
☐ 19. ☐ Artisoft (LANtastic)
☐ 20. ☐ Digital (Pathworks)
☐ 21. ☐ Other *(please specify)*_____

A   B
☐ 57 ☐ **LAN ENVIRONMENT**
☐ 22. ☐ 4M Token Ring
☐ 23. ☐ 16M Token Ring
☐ 24. ☐ Ethernet
☐ 25. ☐ 100M Ethernet
☐ 26. ☐ StarLAN
☐ 27. ☐ FDDI
☐ 28. ☐ LocalTalk
☐ 29. ☐ 10Base-T
☐ 30. ☐ ATM
☐ 31. ☐ Other *(please specify)*_____

A   B
☐ 58 ☐ **COMPUTER OPERATING SYSTEM**
☐ 32. ☐ DOS
☐ 33. ☐ Unix/Xenix/AIX
☐ 34. ☐ OS/2
☐ 35. ☐ OS/2 Warp
☐ 36. ☐ IBM MVS
☐ 37. ☐ IBM VM
☐ 38. ☐ Digital VMS
☐ 39. ☐ Macintosh
☐ 40. ☐ Windows
☐ 41. ☐ Windows 95
☐ 42. ☐ X Window System
☐ 43. ☐ Solaris
☐ 44. ☐ Other *(please specify)*_____

☐ 45. ☐ None of the above (1-44)

8 For which areas outside of North America do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

9 Do you have or plan to install client/server networks? ☐ Yes ☐ No

10 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes			Minis	
	A – Installed	B – Planned		C – Installed	D – Planned
1. IBM	☐	☐	1. IBM	☐	☐
2. Amdahl	☐	☐	2. Digital	☐	☐
3. Cray	☐	☐	3. Tandem	☐	☐
4. Hitachi	☐	☐	4. Unisys	☐	☐
5. Unisys	☐	☐	5. AT&T GIS	☐	☐
			6. HP	☐	☐
			7. Data General	☐	☐

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At this location:		Entire organization:	
	E – Servers	F – Clients/Nodes	G – Servers	H – Clients/Nodes
1. Power PC				
2. Power Macintosh				
3. Macintosh (Other)				
4. Pentium-based				
5. 80486-based				
6. 80386-based				
7. 80286-based				
8. RISC-based workstations				
9. Other				

11 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

01. ☐ $100 million or more
02. ☐ $50 million - $99.9 million
03. ☐ $25 million - $49.9 million
04. ☐ $20 million - $24.9 million
05. ☐ $10 million - $19.9 million
06. ☐ $5 million - $9.9 million
07. ☐ $1 million - $4.9 million
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $249,999 or less
11. ☐ None of the above

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

13 Estimated number of employees at this location/in entire organization:

At this location:		Entire organization:	
1. ☐ Over 10,000	4. ☐ 1,000 - 2,499	1. ☐ Over 10,000	4. ☐ 1,000 - 2,499
2. ☐ 5,000 - 9,999	5. ☐ 500 - 999	2. ☐ 5,000 - 9,999	5. ☐ 500 - 999
3. ☐ 2,500 - 4,999	6. ☐ 499 or less	3. ☐ 2,500 - 4,999	6. ☐ 499 or less

BI 995

Piling up the Virtual Money

That ol' dollar bill is undergoing some surprising transformations as the corporate world sets up shop on the Internet.

By Mark Gibbs

There's an old Scottish proverb: "Money is flat and meant to be piled up."

That's simple enough when you're talking coins and bills, but when the money exists as whizzing bits of data in an on-line environment, things can get complicated pretty fast. For all the excitement surrounding business on the Internet, there are a slew of problems that need to be addressed before corporations can really begin to pile up the virtual money.
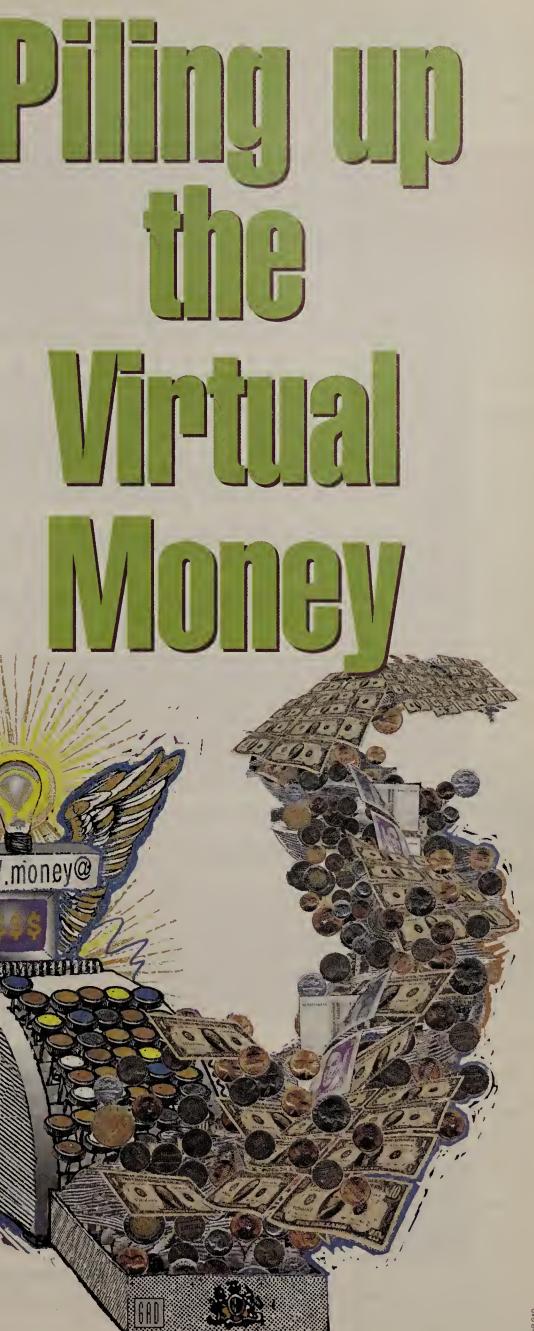
On-line business pioneers have to deal with such concerns as the cost, speed and availability of Internet connections in target markets, as well as how to support secure data transfers. But arguably, the most important issue of them all is how to perform financial transactions — a tangled knot of problems that runs the gamut from the technical (actually verifying transactions) to the socially and legally thorny issue of ensuring customer privacy.

Going into solutions

It's not as though financial transactions can't be conducted on-line today. Electronic commerce takes place every day on private value-added networks (VAN) and the on-line services provided by such companies as CompuServe, Inc. and America Online, Inc.

For VANs, there is little problem in establishing acceptable protocols and guaranteeing privacy and security. The on-line services provide a similar closed environment where risk is minimized and a methodology for buying and selling is well defined.

But on the Internet, no such luxuries as predefined standards for

transaction formats and security exist. Indeed, the commercial Internet market is so dynamic and competitive that a single standard for the exchange of financial data will, in all likelihood, never exist.

Because financial transactions will take many shapes on the Internet, multiple payment mechanisms will be needed. For example, a technology that allows merchants to profitably charge less than a dollar will be as important to the future of

the Internet as systems for transferring millions of dollars.

Such a technology would, for example, let a user pay 10 cents or 20 cents for an article from an on-line archive or some information from a database. These microtransactions aren't really feasible using today's credit cards, with their associated transaction fees. But the first challenge to solve is how to securely transfer transaction data between the buyer and seller.

Managing moola at the moment

Some on-line sellers employ simplistic approaches to the problem — for instance, requiring customers to establish an account by telephone or other off-line method prior to making a transaction.

While this works — it's simple and familiar to consumers — it's too slow and inflexible for wide-scale electronic commerce. More important, it doesn't provide the instant gratification required for casual purchases on-line. If a cruising customer has to go through the work of dialing up and establishing an account, that person may just forgo that impulse buy.

Ease of use in on-line systems is crucial because a clumsy system is at odds with the expectations of customers conditioned to fast, frictionless sales. As any direct marketer will tell you, an obstacle, however small, to placing an order will cost you business.

Some other sellers ask consumers to take the risk of sending credit card data across the Internet. The risk is probably less than most people believe, but the issue of consumer confidence — particularly in light of the hype surrounding hackers and the Internet — will loom ever larger.

Another approach is to show your products on the 'Net and then allow customers to call an 800 number to complete the order. Grant's Florists (http://florist.com/flowers/flowers.html) states on its electronic order form that it believes sending a credit card number across the network is safe. But for wary customers, the company provides an 800 number that can be used to complete the transaction.

The problem: Toll-free service is expensive. And like the other off-line approaches, it really just sidesteps the challenge of providing a secure and reliable means for customers to communicate with merchants and transfer funds.

Snoop-proof links

The need for a secure method of connecting clients and servers in the World-Wide Web — the dominant environment for commercial ventures — has grown quickly as more companies explore their electronic commerce options. Without a framework for making purchases in complete privacy, the problem of secure cash transactions becomes academic.

Given the visibility of the issue, it isn't surprising that some early conflicts arose among proponents of alternative schemes for addressing the problem.

The major players in this arena are the companies in the CommerceNet Consortium (http://www.commerce.net), which proposed a standard called Secure HTTP (S-HTTP), and Netscape Communications Corp., which proposed an alternative approach known as Secure Sockets Layer (SSL).

Until this spring, a religious war was waged over which technology should become the accepted standard.

Financial Services on the Internet

Cybercash
http://www.cybercash.com

Digicash
http://www.digicash.com

First Virtual Holdings
http://www.fv.com

Hewlett-Packard Commerce Approach
http://www.hpl.hp.co.uk/projects/vishnu/main.html

IBM Electronic Commerce
http://www.zurich.ibm.ch/Technology/Security/extern/ecommerce

Mondex
http://www.mondex.com/mondex/

Netbill Project
http://www.ini.cmu.edu/netbill

NetCheque/NetCash
http://nii-server.isi.edu/info/NetCheque

NetChex
http://www.netchex.com

NetMarket
http://www.netmarket.com

NetScape
http://www.netscape.com

Open Market
http://www.openmarket.com
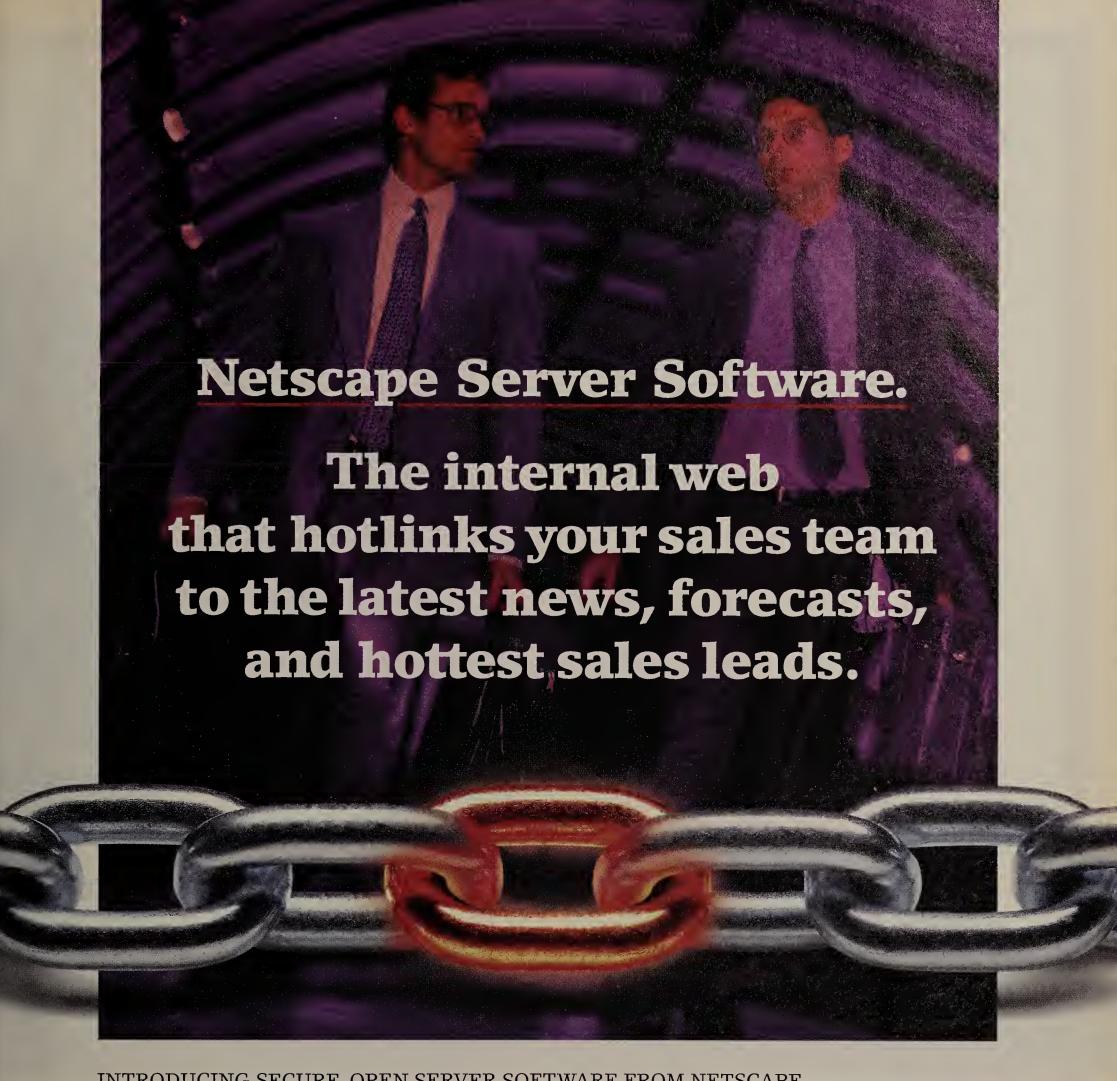
Sandia's Electronic Cash System
http://www.cs.sandia.gov/HPCCIT/el-cash.html

Software Agent's NetBank
http://www.charm.net/

Curiously, the alternatives are not mutually exclusive. In fact, they offer similar services, such as client and/or server authentication and end-to-end encryption of data.

The battle for dominance came to an abrupt end at the Internet World show in San Jose, Calif., last April, when America Online, CompuServe, IBM and Netscape became equity holders in Terisa Systems, Inc. — a development house for, and backer of, the S-HTTP technology. They share control of the company with Terisa founders Enterprise Integration Technologies, Inc. and RSA Data Security, Inc.

Terisa will provide a developers' tool kit that combines support for both of the existing protocols.

The importance of this event can't be understated. It removes much of the fear, uncertainty and doubt keeping potential merchants off the Web. The result of the deal will be Web servers — probably available in early 1996 — that can carry out secure transactions with clients supporting either technology.

Moving money and counting cash – virtually

But while a secure channel is vital, the problem of transferring funds from one party to another requires more structure than messaging. This is the realm of electronic, or digital, cash.

Digital cash is a generic term for a set of technologies based on cryptography. These technologies ensure that an information transfer, which could concern money or sensitive information, is auditable, verifiable, protected against fraud and, ideally, supports anonymity.

A variety of companies are working on digital cash technologies, including First Virtual Holdings, Inc. and Cybercash, Inc.

One of the most talked about and, arguably, the most significant digital cash system is from a Dutch company, Digicash BV. Digicash has pitched its Ecash, currently in beta test, as the basis for electronic commerce on the Internet.

The Ecash client software is available for PCs and Macintoshes, and software for other platforms is under development. Merchants that wish to support Ecash establish what Digicash calls cybershops. Early adopters include Encyclopedia Brittanica (http://www-lj.eb.com), *Wired*'s HotWired Digicash experiment (http://www.hotwired.com/coin), and Wade's Online Grocery Store (http://rainer.bnt.com/htbin/wa).

Customers who wish to purchase from these shops need to have established Ecash accounts — in essence, buying virtual cash with real money. The actual exchange of real, physical money is done in the same way that checks and credit cards are handled today.

The Ecash technology is quite complex. It is based on digital signatures and a public-key encryption system. (See the Digicash Web page, http://www.digicash.com/publish/digi-bro.html, for an explanation.)

Public-key encryption involves a pair of numeric values — public and private keys. Messages encoded with the private key can only be decoded with the public key. By supplying all users with its public key, a bank makes it possible for them to decode any message encoded with its private key. If the decoding yields a meaningful message, the user can be sure that only the bank could have encoded it.

Here's roughly how the Ecash system works: A shopper's PC generates an encrypted note to pay for something purchased on-line. The note is transmitted to a bank, which debits the customer's Ecash account and uses its private key to digitally sign the note, ensuring that when it is returned by a vendor, its validity can be confirmed. Once a merchant receives the note, it can confirm the authenticity of the note using the bank's public key. After the note is returned to the bank, funds are transferred to the seller's account.

The beauty of this scheme is that a note can't be spent twice without the transaction being invalidated immediately.

More cash alternatives

Digicash isn't the only choice. There are now more than a dozen industrial-strength financial transaction systems

Occasionally, you'll compromise and

eat a veggie pizza instead

of your favorite—pepperoni.

Sometimes, you'll even be

talked into leaving a close game early,

merely to beat traffic.

But when it comes to

Fast Ethernet

under development. None are really much beyond the starting gate at this point, but the next few months will see some serious movement toward establishing standards and marketing territory for the contenders.

Netscape, the company that controls the dominant share of the Web browser market, is establishing a strong position based on its Netscape Netsite Commerce Server software.

In November 1994, Netscape announced a partnership with First Data Card Services Group's Electronic Funds Services, the world's largest credit card payment processor. The agreement will enable banks to help on-line merchants and users worldwide by providing real-time on-line card authorizations. This will allow consumers to purchase goods via the 'Net using any major credit card.

It should come as no surprise that Microsoft Corp. is also developing a position in this arena. While Netscape and First Data were getting together, Microsoft teamed with Visa International, Inc. to provide functionally identical services aimed at an even broader market that may even include sales via interactive television.

Financial services on the Internet are poised for vast growth. Merchants of the new transaction systems are bringing their technologies beyond the development and testing phases and looking to grab their share of the electronic commerce market.

If you plan to use such a system, you'll have to do some careful evaluation to ensure that you have the right services for the kind of business you want to establish on-line.

Among other things, you'll have to explore:
• How complex is the software? Is it easy to use by non-computer-savvy buyers?
• Is special hardware required?
• Does the system support micropayments (transactions of less than $1)?
• Does it support credit card and/or debit transactions?
• Where does the responsibility for

A technology that allows merchants to profitably charge less than a dollar will be as important to the future of the Internet as systems for transferring millions of dollars.

accounting lie? With the merchant or the financial transaction system vendor?
• What does a transaction cost? Is there a fee plus commission or just a commission to be paid to the transaction system vendor?
• Who assumes the risk of fraudulent or stolen electronic cash?
• How secure is the system? Does it support anonymity for customer transactions?
• Is the system suitable for the merchant environment and application?

Figuring all that out is no easy job, and that's why approaches such as Netscape's Netsite Commerce Server may be successful early on; they integrate the transaction service with all the components required to create an Internet sales site.

Even more important for the future will be financial transaction systems that can support custom Internet applications on multiple platforms.

The bottom line is that the race between financial transaction system vendors will produce a range of workable solutions within the next year, and that's a big victory for Internet merchants and consumers.

Companies that establish an effective commerce presence on the Internet and use the right mechanism for collecting virtual funds will be able to start piling up the cash. Then, as the late Senator Everett Dirksen noted, "A billion here, a billion there, and pretty soon you're talking about real money." ✳

Serial Port

Parallel Port

How our V.34 modems with Advanced Parallel Technology solve the serial port bottleneck.

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MISSING THE POINT

by jim sterne

No, no, no!

You don't

understand

how radio

works!

I simply

fade my

voice out

like this

and cue

the

organist..."

Shame on you, webmasters of Corporate America. In your blinding rush to catch the World-Wide Web wave, you've missed the boat. You should be strapped down and forced to watch your own home pages reload over a 300 bit/sec modem again and again.

What are you missing? The same thing your predecessors missed when they combined radio spots with magazine spreads and called it television advertising.

You're missing the point.

The point of television was that you could show things to people they couldn't otherwise see. The point of the Web is that you can get information from people you couldn't otherwise communicate with.

Would you spend a bundle of your hard-won marketing budget on a telemarketing campaign simply to call people, read a script and then hang up? Don't you want to know what they have to say? What they think? What they want to buy?

Oh sure, the Web is a marketer's dream come true if all you want to do is publish product information — your cost of global distribution gets as close to zero as possible. And, yes, there are lots of people who would rather read your product specs on-line than have to deal with an under-educated, overpaid sales rep.

But the Web offers such a wonderful opportunity for gathering information. Use it!

So, before you throw another repurposed brochure up on your Web site, before you scan in another annual report because it's already been approved by the corporate communications office, before you record another worthless, "Hi there! I'm the CEO of this outfit, and we're pleased as punch that you're here!" message, think about using the Web as an information gathering tool.

Start by watching the people who took the time to do it well.

Check out Blackbox (http://www.blackbox.com) and see how the company asks users to rate the value of expanding the Web site. Blackbox wants to know if users would prefer more product or reference information, expanded ordering capabilities or enhanced support facilities.

Take a tip from Apple Computer, Inc. (http://www.apple.com), which doesn't ask how fast your modem is, but whether you *felt* the throughput was fast enough.

Go to your computer, log on and study the Ragu Pizza Sauce site, "Mama's Cucina" (http://www.eat.com), a brilliant piece of Web architecture. Users are invited to participate — write stories, list restaurants, share recipes. Then you should admire, with tears of admiration in your eyes, the questionnaire with almost 50 detailed shopping, eating and consuming questions.

Fifty questions? How could they expect people to bother? "The response has been overwhelming," says Alicia Rockmore, associate brand manager for Ragu.

Tom Cunniff, of the Cunniff Consulting Group in New York, who worked with Rockmore, is "still amazed at the number of people who take the time to fill in the form. After working 16 years in traditional mass advertising, it's gratifying to learn that if you charm people and show a little respect, you can begin to build real relationships between a brand and its customers."

People are more interested in themselves than anything else. A wise marketing manager is more interested in clients and prospects than anything else. The Web is the perfect place for the two of you to get together.

As Michael Schrage of the MIT Media Lab put it, "The real value is in the interaction. . .real interactivity isn't about giving people more content to choose from; it's about letting people create their own content."

In other words, make your Web site *their* Web site. Ask people to reveal themselves and they will.

Try to keep in mind that your Web site is not a corporate brochure, it's a customer experience. Kristin Zhivago, editor of the "Marketing Technology Newsletter," created the water analogy for the Web:

"If your delivery medium was water, broadcasting would be like using a big hose to spray a crowd of prospects, hoping some of them will enjoy getting wet. Narrowcasting...is like using a smaller hose and only aiming it at people who have already expressed an interest in getting wet. Cybercasting (marketing on-line) is the act of creating a pond of water in cyberspace...and inviting them to come for a swim."

The key is to figure out how to get them to come, how to get them to stay, how to get them to come back and how to get them to buy your product, service or point of view.

The rules are simple:

• Treat your Web site like any other event and market it. If they don't know it's there, they won't come.

• Concentrate on them. Know your audience and show them what they want to see, not what you want to show them.

• Solicit their input. Those wonderful people you want to become your customers are sitting at a keyboard, able to respond. Ask for their opinions.

Then be sure you are ready, willing and able to give them what they ask for. After all, the Web is a two-way street. They can easily walk the other way. ✺

Sterne is the author of *World Wide Web Marketing* (J. Wiley & Sons, October 1995) and a marketing consultant in Santa Barbara, Calif. He can be reached at (805) 965-3184 and at jsterne@targeting.com.

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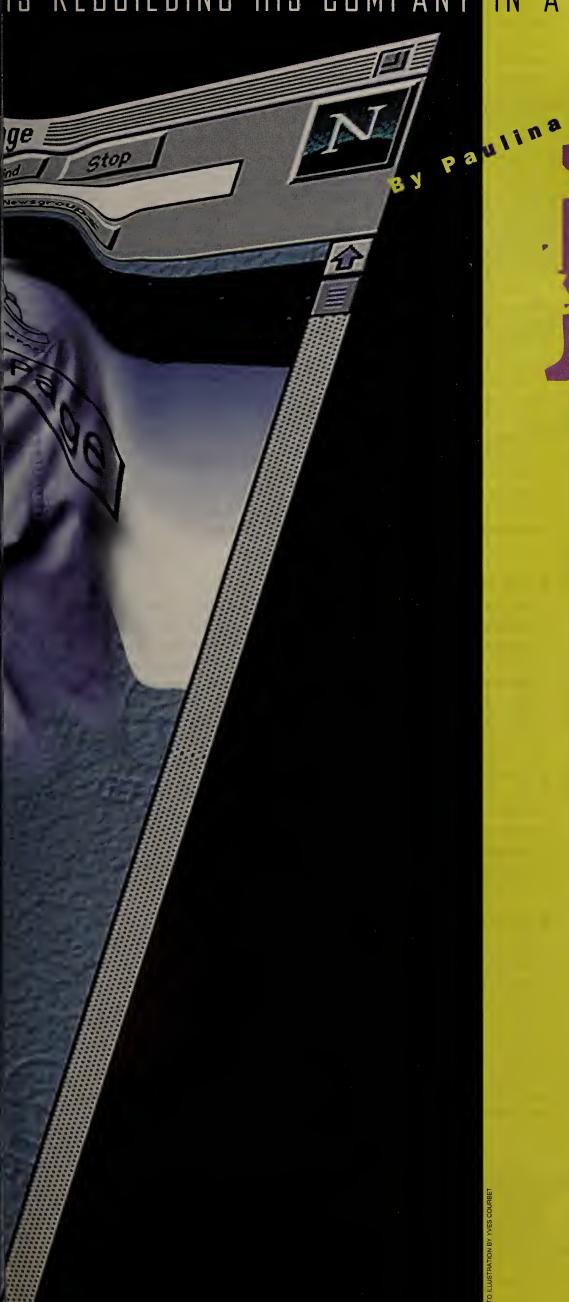
IS REBUILDING HIS COMPANY IN A NEW ELECTRONIC IMAGE

By Paulina Borsook

im Griffin wakes up each day wondering "How can I destroy the company?"

For Griffin, director of technology for Los Angeles-based Geffen Records, "destroying the company" means figuring out new ways to employ technology to restructure business processes and prepare for the future in a very competitive world. Among other things, Griffin is the man responsible for making Geffen, which grossed $505 million in 1994, the first company in the music industry to have its own World-Wide Web site.

"You go broke in Hollywood if you only try to do things better and faster," Griffin says. "Technology has to be the means to do something different. If all you expect of the network is greater efficiency, you'll be sorely disappointed."

Griffin and his staff have created a culture in which all Geffen employees now find the Internet "indispensable," in the words of Kim Estlund, Geffen public relations assistant.

The art department at Geffen Records uses the 'Net to check the status of packages via FedEx's home page. It also sends and receives art from visual artists and production houses, saving thousands of dollars, particularly when work from overseas artists is involved.

Assistants in A+R (the department responsible for artists and repertory) use the Internet to maintain strong ties with college radio stations, listen in on what Usenet newsgroups have to say about Geffen Records' artists, and scan the do-it-yourself Web home pages of various fan clubs. 'Net access is also highly encouraged with Geffen Records' business partners: for example, to communicate between lawyers and to send graphics files for cover art to CD-pressing plants.

As Griffin puts it, electronic mail is not the reason to have a network. But if E-mail makes it possible for one of Geffen's scouts to send in audio or video of a band in New York so the company can sign the group 24 hours faster — scooping a competing label — then the Internet has paid for itself.

And in a business largely funded by one act truly hitting the big time (and paying for all the groups that turn out to be middling successes or noble experiments that fail), Geffen Records' network strategy can make a critical difference to the company's success.

Case in point: Geffen's technology investments paid off when the company was courting a hot group, Girls Against Boys, a band everyone in Hollywood was anxious to sign. A+R marketing staffer Luke Wood marched the group into the server room of the Geffen Data Network and asked band members to explore their technology dreams.

It turned out what they craved was access to the Internet through fully-loaded laptops, which is just what they were promised if they signed with Geffen Records. Girls Against Boys did sign, and within 24 hours, band members had top-of-the-line Apple Computer, Inc. PowerBooks complete with a full suite of Internet access software, as well as connections to America Online and CompuServe.

For a record label with a stable of fewer than 50 artists, signing a major band is a coup. Everyone at Geffen Records is pretty sure that aiding Girls Against Boys efforts to be totally hip — by being totally wired — was part of what drew the band to the label. No other record company trotted the band through its technology department. And probably no other record company could have inspired the confidence that it could deliver ready-to-go Internet action to the musicians.

Homework

Averaging about 110,000 hits per week (and rising all the time), the Geffen Website (http://www.geffen.com) has a home page for every band on the label. Here, Geffen Records artists display 30-second video and audio clips, along with whatever other materials — text, images — the artists want to provide.

The Website also provides easy links both to CDNow (an on-line CD-ordering

service) and Pollstar, a Web-based service that tracks band performance dates all over the world. The Pollstar database makes it possible for music fans to scan by date, name of band and location. That information, now instantly available and always current, used to be transmitted by facsmile and photocopied around Geffen Records.

The CDNow link is customized for the Geffen Website: visitors are greeted with a Kmart-spoofing message "Welcome Geffen shoppers," and an on-screen button returns them to the Geffen Website once they are through ordering.

Robert von Goeben, Geffen Records' coordinator of Internet content, says there's a good match between the kinds of acts Geffen signs (rock and roll) and the demographics of the 'Net (mostly young men).

And since the label is signing many young artists putting out their first records, the newest crop of Geffen performers has gotten acquainted with the 'Net in school. Artists have friends that want to help them create Web pages or are themselves familiar with HTML — the lingua franca of the Web. For example, one of the band members of Geffen Records' act White Zombie did all the design work for the band's home page.

By having a strong presence on the Web, the company is establishing a strong identity in its strongest market. "Bands are now calling me asking to get involved [on the Web]," von Goeben says.

Fluid mechanics

The decision to invest in its own Web server on-site, rather than contract out to a Web service provider, aids in Geffen's self-education in technology. The thinking is that if Web functions were contracted out, the technology department would not be gaining the detailed knowledge it is eager to acquire of what does and does not work in terms of technology, user interface and content.

What's more, Jim Dinda, Geffen Records' Macintosh expert, says that having www.geffen.com onsite "gives us complete control," so the company has total autonomy over uploads, downloads and crashes — if they occur. The Web machine also doubles as the company's mail server.

Having the Website close at hand means it is getting updated, tweaked and refined constantly by a staff whose sole passion is creating way-cool workable technology for the company. Continual improvement of the Website, mostly through the addition of contantly refreshed content, creates an incentive for fans to keep revisiting the site to see what's new.

"It's easier to experiment with HTML," says Griffin, and having the Web machine on-site also reinforces the company's vision that connecting to the Internet is a two-way proposition: The company should be creating fun and effective content for, and not just selling to, the Internet.

Griffin makes it clear that the Website should be a space for material that can't be obtained elsewhere and not for shovelware — that is, repurposed material from other media. What kind of original material? Live video feeds from the snake pit (yes, with real, live snakes) at the house of Slash, one of the members of the Geffen band, Guns 'N Roses. Links to fan home pages. And in the future, offering the spoken word, such as Geffen artists reading poems they like.

"Most companies view using the Internet as gaining a market, bringing the company to cyberspace — for example, using a Website as a sales tool. We reject that course; we want to bring cyberspace to the company," says Griffin.

For example, Geffen Records goes out onto the 'Net to make use of such resources as the Internet Underground Music Archive (IUMA), a repository of audio files of mostly unknown and unsigned groups.

This is not to say Geffen Records is averse to using the 'Net for market research. Every few months, the company will run a contest where Geffen Website cruisers voluntarily supplying some basic demographic information — for example, where they're from, their income levels, their taste in music — are entered

"Most companies view using the Internet as gaining a market, bringing the company to cyberspace — for example, using a Website as a sales tool. We reject that course. We want to bring cyberspace to the company."

into a drawing for free Geffen CDs.

Von Goeben says that when they've run similar contests in magazines, they've gotten responses from 200 to 300 people. But running the contest for two weeks on www.geffen.com garnered 2,500 responses — responses that had already been typed into electronic forms made available on the Website, so there was no need for manual rekeying. The demographic information could immediately be transferred to an Excel spreadsheet.

Intangibles

There are other important, if hard to quantify, reasons for Geffen Records' investment in the 'Net. For one, like all of those in the music industry, Geffen lives and dies by its ability to satisfy the cravings and understand the sensibilities of the under-25 age demographic.

What better way could there be to hone in on this generation of Internet-savvy kids than to use the 'Net itself for a listening post? And what better way to establish Geffen as a label that's au courant than to establish its strong presence on the 'Net, where an entire generation of college kids is hanging out?

In fact, Griffin says "an inordinate number" of the visitors to the Geffen Records Website have the suffix .edu in their home address ("a terrific demographic for us"), and ever-increasing numbers are not from the United States. That's a plus for the company, which does not have its own international distribution function in-house.

Another benefit to the "Net-ing" of Geffen Records is that its immediate corporate parent, MCA, has recently gone to a Transmission Control Protocol/Internet Protocol-based royalty payment scheme for artists. And without the expertise with routing and 'Net protocols the Geffen Records technology department had already gained, coping with the parent corporation's new MIS demands would have been far more difficult.

And as von Goeben points out, when company higher-ups are approached about possible new technology ventures, a technical team well versed in both the technology and culture of the 'Net can realistically assess such proposals.

How it happened

Back in 1992, a now-departed Geffen A+R staff member locked onto the value of computer networking within corporations, inspired by the work of *Bionomics* author Michael Rothschild. Rothschild, much admired within Silicon Valley, borrows from biology to describe economic behavior, and, among other ideas, actively advocates the use of computers and networks to help organizations achieve the same adaptive, flexible responses as living things.

The consultant hired to help map out this internal networking of Geffen Records was Jim Griffin, who has experience in the newspaper business (and its turn toward the electronic, whether in producing, archiving, accessing or distributing information) and bulletin board systems.

To a company that barely had 20 computers for its 200 employees, Griffin brought a vision of everyone on-line and equipped with a workstation, communicating both within and beyond the corporation, working in a corporate culture of reduced hierarchy and optimized access. Now, Novell, Inc.'s NetWare 3.12 links everyone within Geffen Records just as they are all linked to the outside world through the Internet.

Brass tacks

For its Website, Geffen Records started with a 56K bit/sec link to Netcom, its Internet service provider, but moved up to a T-1 line within a few months of going online. A T-3 pipe may be in the offing, particularly as Web hits increase. An Intel Corp. Pentium-based server supports the site.
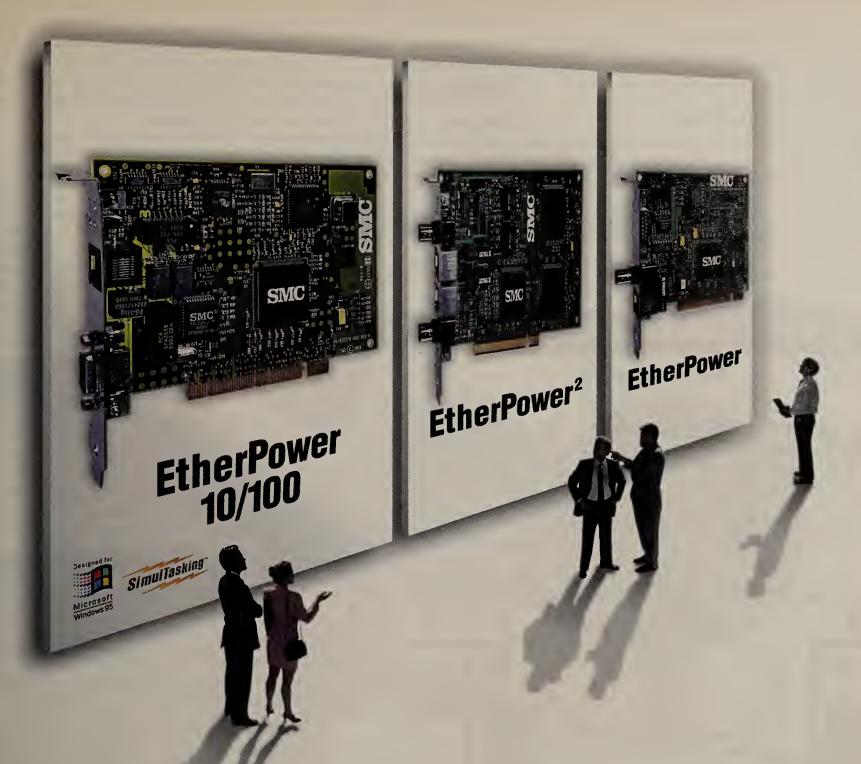
The company spends more than $1 million per year overall in computer and communications hardware, software and services, keeping its users on a constant upgrade path of better workstations and connections.

An Integrated Services Digital Network connection between Geffen Records' New York City branch office and headquarters in L.A. gives the Manhattan outpost of the company its access to the Internet

Geffen uses Netscape Communications Corp.'s Web client because, as Dinda says, "it's the best one. It has the most advanced features and supported HTML 3.0 before anyone else did. Netscape's development cycle is the best of any around."

Geffen Records relies on common sense security measures to protect the in-house network but has also hired Dan Farmer as a consultant to perform security audits a few times a year and to attempt network break-ins. Farmer, a former Silicon Graphics/now Sun Microsystems employee, is somewhat infamous for developing and releasing onto the Internet SATAN, a hacker's tool kit designed to seek out network security weaknesses.

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In keeping with this practice of hiring those with serious Internet expertise, Griffin recruited Geffen's Internet master Chris Bradfield by posting an employment notice on the Internet's alt.wired newsgroup. And the director of technology won't even consider hiring someone unless that person has a working Internet address: a job-candidate with an E-mail address from a new-bie service such as America Online probably wouldn't make the first cut in Geffen technology recruiting.

For the future

In the near term, Griffin and his staff are working on developing an internal Website for Geffen Records, so that everything from human resources information to internal phone directories will be accessible using the Netscape client.

Unlike many companies considering the commercial uses of the Internet, Geffen Records honors traditional Net-ethics of being a good citizen that neither spams nor solicits. "There are no plans to annoy people on the Web," says Griffin, by committing Netiquette-violating gaffes such as sending out unsolicited mailings to lists of users obtained from Geffen Website visitors.

But to make the Website more responsive to both the global community of the Web and to the increasing diversity of the U.S., there are plans afoot to make the Geffen Website multilingual and multinational.

"Our prime goal is education. We don't care how many records we [in the technology department] sell," says Griffin. The Geffen technology department is using the communications technology of today to learn how it can be leveraged for competitive advantage in the future. "The standard artist contract is for seven years, and we want to show artists we'll know how to sell their records at the end of their contracts."

As von Goeben puts it, "We've been given the mandate by higher-ups, both in freedom and resources, to be R+D."

The heavy investment in Internet technology is also consistent with the company's philosophy of being an artists' label, not a commercial label. It's not Geffens' practice to take out huge ads in industry publications or crank out thousands of promotional T-shirts to support musicians in their artistic efforts.

> Having the Website close at hand means it is getting updated, tweaked and refined constantly by a staff whose sole passion is creating way-cool work-able technology for the company.

So involving musicians in the design of the Web pages (focusing on artists) and taking the moral high road in Internet marketing strategy (no crass commercialization) fits very well with the company's existing corporate culture.

Geffen Records is learning enough about Internet technology and marketing so the company will be ready, for example, when the time comes that audio masters of albums will be downloaded directly to the plants that manufacture CDs. Or when record stores of the future press CDs on demand for their customers. Or when customers paying whatever on-line royalty has been worked out in the new realm of cyberlaw get music downloaded for a fee directly over the 'Net. Or when entertainment of all kinds is delivered quickly, cheaply and directly to the home.
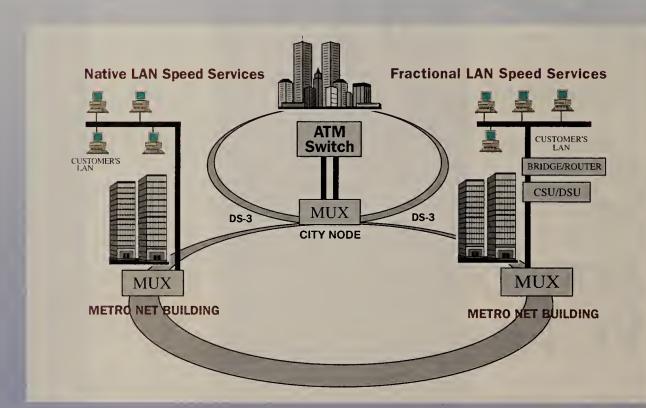
Griffin sums up his Internet philosophy by quoting star hockey player Wayne Gretsky: "Most follow the puck and skate to it. I figure out where the puck is going to go, and wait for it." *

San Francisco-based Borsook (loris@well.com) has had journalism, fiction, poetry and essays appear in publications as disparate as Wired, Newsweek, IEEE Spectrum *and the MIT Press quarterly,* Leonardo.

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Once you've
set up shop
in the Ether, you
have to make sure
customers know
how to find you.
Here's how.

Hello—Is there anyone out there?

By
Adam Gaffin

VictoR GAD

The Internet today is a lot like New York City — it has an amazing array of places to visit and things to do, but unless you have a good guidebook (or are good friends with some of the natives), you'll likely miss a lot.

And if you're a corporation seeking to do business on the Internet, it's vital to get into one of those guidebooks, lest customers pass you by.

The Internet's equivalent to the guidebook is a series of databases that let users quickly find everything from specific World-Wide Web sites to Usenet postings on particular topics. Let's take a look at some of the more popular databases and how to use them, then explore how you can get your own information on them.

What's up?

One of the oldest Web-based resource guides is the National Center for Supercomputing Applications' What's New page. NCSA started What's New not long after it released its original graphical Mosaic browsers way back in the mists of ancient Web history, a year or so ago. Today, NCSA is handing What's New to Global Network Navigator, an advertiser-supported service that O'Reilly and Associates, Inc. started and recently sold to America Online, Inc. (Most of the major Web-based information search engines are going commercial in one way or another.)

Three times a week, What's New provides listings of 200 or so new Web sites; these are then incorporated into a searchable database. To try out What's New, start your trusty Web browser and point it at this Uniform Resource Locator (URL): http://gnn.com/gnn/wn/whats-new.html.

Yeeha!

Yahoo was one of several Web databases to spring up about a year ago; its name stands for "Yet Another Hierarchically Organized Oracle," and like What's New, it is moving from a college to a commercial enterprise.

Yahoo is sort of a table of contents to an Internet encyclopedia. Like What's New, it is organized around overall Web sites, rather than specific documents on

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WEB SEARCHING
Reebok rulez!

Reebok International, Ltd. thought a Web site would be a good way to learn what its customers really want in footwear.

So far, the Web has proved an excellent fit, says Brenda Goodell, vice president of programming and event marketing at the $3 billion footwear giant, based in Stoughton, Mass.

The Planet Reebok site is averaging 250,000 to 500,000 "hits" a week, Goodell says, noting that the company is looking at adding software that would give it a better idea of how many individual users that equals. The site was officially launched in December, and Goodell says she has been startled by the large number of hits from overseas.

Beyond the usual marketing and product information — users can download detailed technical specifications and diagrams for the company's sneaker lines — the site also boasts a Usenet-style conference, something that is

unusual for a corporate Web site. Some 1,200 messages have been posted since December, some of them critical of the company. But rather than delete them, Reebok answers them in public.

The company has also experimented with live CU-SeeMe conferences with sports figures such as pitcher Roger Clemens and basketball player Dominique Wilkins.

Goodell says the site was launched with a small ad in *Wired* magazine in December and with a posting to the NCSA What's New server in January. But users seem mostly attracted by word of mouth on the 'Net, an indication of the importance of interesting content to draw people in. She adds that the company is starting to include the site's URL in some print and outdoor advertising.

Planet Reebok can be reached at http://www.planetreebok.com.

— Adam Gaffin

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those sites. So if you want to find sites related to *Star Trek*, for example, Yahoo is a good place to start.

But if you want to find documents specifically related to the material used to make Mr. Spock's ears, you'll need to use another search engine, such as Lycos or InfoSeek, described below.

Yahoo currently has links to some 30,000 Internet resources (mostly Web sites but also Usenet and Internet Relay Chat conferences). It's searchable in two ways — as a hierarchical table of contents, which is good for general browsing, and via a Boolean search form for those times when getting information quickly is important.

To get to Yahoo, point your Web browser at http://www.yahoo.com.

The spider's lair

Lycos, at Carnegie Mellon University, is named for the predatory wolf spider. On the Web, Lycos is sort of the vacuum cleaner of the search-engine set, sucking in every single URL it can find, whether for an entire site or for specific documents on those sites.

It does this through an automated program, known as a spider, that roams the Internet in search of Web and Gopher servers (sort of like a real spider crawling around its web in search of tasty insects). It then catalogs everything on the site and incorporates the information into a database that contains several million URLs. (Because the spider periodically revisits sites, however, you'll find that many of its listed URLs are, in fact, duplicates.)

If you are looking for every last mention of a specific word or a document on

the Internet, Lycos is an excellent resource. Lycos relies on a relevancy ranking to determine the order of any hits — the higher in a document, or the more frequently your keyword appears, the higher it will be in any resulting Lycos list.

SIFTing through Usenet

With more than 10,000 conferences, Usenet has discussions on virtually every possible subject. But tracking all discussions on a given topic can prove difficult. That's where Stanford University's NetNews Filtering Service comes in. Known as SIFT, this database, accessible by E-mail, catalogs all the Usenet messages that pass through Stanford each day.

By submitting an E-mail "profile," you can get the database to keep tabs on messages of particular interest to you. Once a day (or less frequently, if you prefer), the database notifies you by E-mail of any matches, along with the subject line and the first few lines of those messages.

If you want the entire message, you can retrieve it via E-mail. You can also search the entire database for past messages on specific topics.

For more information, including the specific wording required for the profiles, point your Web browser at http://sift.stanford.edu or send a message of "help" to netnews@db.stanford.edu.

Seek and ye shall find

Combine Lycos and SIFT and add a search engine that allows queries in plain English and you've got InfoSeek. Backed by $2 million in venture capital, Santa Clara, Calif.-based InfoSeek is the first Internet search server to start out as a commercial operation.

It currently catalogs some 200,000 Web pages and 10,000 Usenet conferences, as well as a variety of computer publications, such as *Computerworld* and *InfoWorld*.

Unlike the other servers, InfoSeek charges for full access, at rates that start at $9.95 a month for 100 queries (additional queries are 10 cents each; there are also additional fees for searching some of the publications). For more information, point your browser at http://www.infoseek.com.

Getting the word out

As mentioned earlier, you can't just go around posting ads all over Usenet, unless you're curious about what a mailbomb is. But there are other ways to let people know you exist.

One is to get your Web site listed on the more popular search servers — the more places you're listed, the more likely a potential user is to find you. What's New, Yahoo and Lycos all accept submissions of new Web sites (they also have links to other search engines not mentioned here).
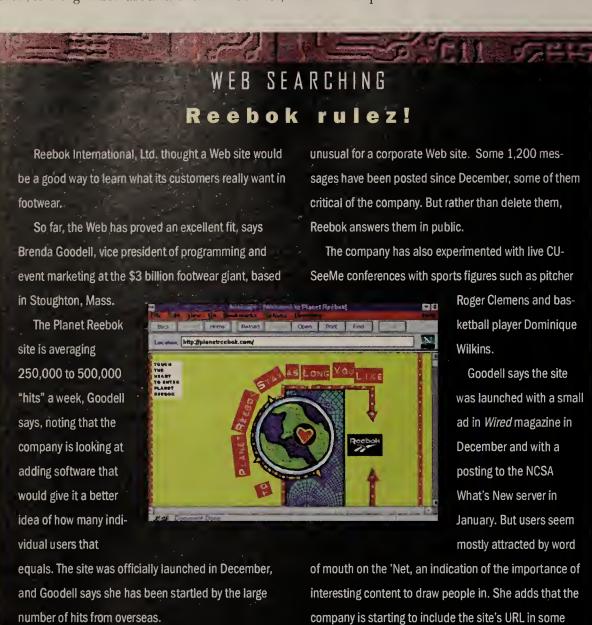
All three have on-line search forms that typically let you submit the site name, its URL and a brief description. It's particularly useful to get into What's New and Yahoo because many people use them to find new sites to explore.

Another useful resource is the comp.infosystems.www.announce Usenet newsgroup, which functions as a sort of daily What's New. The group is moderated: To submit a listing, write to www-announce@boutell.com. A good idea is to go into the newsgroup first to see how others post their announcements; brevity is an asset.

One thing you cannot count on with any of these resources is the exact timing of when your message will appear — it can range from a couple of days to two or three weeks. So if you're announcing a time-sensitive resource, make sure to get your listing in well in advance. ✱

Gaffin is on-line editor at Network World. *He can be reached at agaffin@nww.com.*

The Internet's equivalent to the guidebook is a series of databases that let users quickly find everything from specific World-Wide Web sites to Usenet postings on particular topics.

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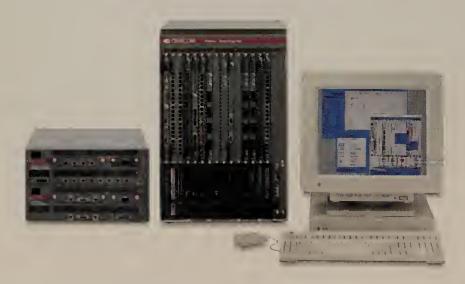
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A novel Internet service ensures that buyers and business partners get exactly what you wanted to send them.

Sam Goldwyn, the Hollywood producer, once remarked that "a verbal contract isn't worth the paper it's written on." Much the same might be said of digital contracts or, indeed, any electronic document.

In business, being able to prove the veracity of a document is crucial. You sometimes need to know, or even prove, when it was written and whether its contents are original or altered.

Enter notarization: Notarizing a printed document verifies its existence and contents at a specific point in time.

But in today's business world, schlepping down to the notary's office is too slow and costly a process for most business documents. And it simply doesn't work for doc-

aNOTARY FOR THE NET

By Mark Gibbs

uments that exist only in electronic form. Such documents can be easily altered, and proving that an electronic file was actually received can be difficult.

With business turning its attention to electronic commerce, there's a growing need for the digital equivalent of the notary public.

The Virtual Notary

A new Internet-based service, the Digital Notary System from Surety Technologies, Inc., may just fit the bill. From your desktop, you can register the contents of a document, at any given time, with the Surety service — and the document never actually leaves your computer. Once you've sent the document to a customer or some other business partner, the recipient simply checks the Surety database to confirm that he got the real item.

The Digital Notary System works by establishing a metric — called a fingerprint — based on the contents of a document, and then creates a validation certificate that can be used by the recipient to verify the document.

The fingerprint is developed using a cryptographic technique based on a one-way hash algorithm. One-way hashing creates a unique code, a string of characters known as the document's hash value. Two documents input to the one-way hash algorithm will always produce two different fingerprints, so long as the documents are not exactly the same.

Surety, rather confusingly, calls the client software that runs on your local computer the Digital Notary Server (actually, having the acronym DNS — which stands for Domain Name Service, among other things — for the software is even worse).

The client uses a patented, proprietary synchronization protocol to transmit a document fingerprint across the Internet or via a dial-up connection to one of Surety's Coordinating Servers. Surety also plans to offer leased-line connections to customers that prefer a direct link.

The Coordinating Server software fixes each document in time through what is called a super hash value. This value combines the fingerprints of all documents submitted within each one-second interval.

All the super hash values are entered into a database called the Universal Validation Record that can be accessed across the Internet for on-line validation. (Surety also plans to issue annually a CD-ROM containing the entire Universal Validation Record database for the past 12 months.)

When you send a document, the client software sends along the validation certificate. The recipient compares the document, the certificate, a newly generated document fingerprint and the Universal Validation Record, and the change of even a single bit in the document will be detected.

A Sure Thing

Surety claims the Digital Notary System activities occur as a series of easily verifiable events, so that no single party can compromise the system. And the company makes a big deal of that intrinsic integrity. "You can trust us, because you don't have to" is the company's slogan.

A key integrity feature is that the actual document never leaves your computer during the certification process. Only the fingerprint and other verification information is transmitted to the Coordinating Server.

That's important because it ensures that a third party never sees the entire document and that minimal amounts of data are transferred — a crucial issue if a lot of documents are to be certified.

The Digital Notary System can be used to certify any digital document, including word processing files, text documents, databases and database records, electronic mail messages, spreadsheet files, graphic images, audio and video recordings, or any other kind of binary or text file.

But the Digital Notary System is not a complete solution for business document authentication. What's missing is support for digital signatures, a cryptographic technique that allows you to add an electronic signature to a digital document.

Surety acknowledges that shortcoming, noting that "digital signatures are important because they verify the who and what about a document. The Digital Notary System verifies the when and what."

Many organizations will use both systems. The Digital Notary System increases the security of digital signatures by certifying the signature. And even if the signature's integrity is compromised later, its integrity at the time it was added to the document can be verified.

Surety also offers an API and a software developers' kit, which allow the Digital Notary System to be integrated with applications. That might be useful for such applications as individually notarizing records as they are added to a database.

Running Digital Notary

To run the client software, you need an IBM PC with a minimum of 8M bytes of RAM, 5M bytes of available hard-disk space, Windows 3.1 or Windows for Workgroups, a VGA monitor, and an Internet connection with a standard WinSock TCP/IP stack.

System requirements for the Personal Edition for Sun SPARC are a SPARC system running Solaris 1.1 with OpenWindows 3.1 and an Internet connection.

Surety has an Enterprise Integration Program for companies that wish to integrate the notary technology with their applications, and to qualify for volume discounts and fixed-fee scheduled payments.
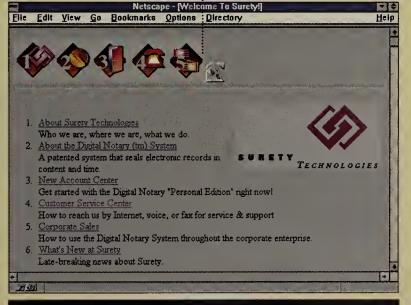
The Digital Notary System has a one-time sign-up fee of $49, which covers a single machine and the first 50 certifications.

Sure With Surety

The bottom line: Surety's Digital Notary System is unique. The company is the first to offer a truly electronic notarization service and, given the complexity and range of services offered by Surety, it is unlikely that a competitor will emerge in the near future.

Surety is still relatively unknown but it is likely to become a major player in the Internet business services market.

Surety Technologies: (201) 701-0600. ✳

You can find out more about Surety Technologies' Digital Notary System at http://www.surety.com.

The Millennium Bandwagon

mark gibbs

The idea that our society will actually reach the year 2000 is amazing.

In the course of the 20th century, we have survived, among other calamities, two World Wars, and the Korean, Vietnam and Cold wars. We have made it through pesticides and pollution (we hope), industrialization (arguable) and the unremitting onslaught of amazingly bad television programming. We have seen the economy go boom (the '60s) and bust (the '30s), and the icons of business struggle to adapt to rapidly changing market conditions (in the computer business, IBM comes to mind instantly).

Now, as the century races to its close with its pants on fire, our culture is undergoing yet another change. This change is going to affect our businesses more profoundly than any other shift in our lifetime and, possibly, the entire history of trade.

I'm talking about the now-unstoppable move toward wide-area communications, not only as the basis of business-to-business transactions, but also as the main information and interaction conduit for consumer markets.

When I refer to wide-area communications, what I'm really talking about is the Internet because it is the most important convergence point for all communications systems. Not because it is the best, the fastest or, for that matter, the most reliable, but because the Internet is there now, it's cost-effective and ubiquitous.

Forget the media hype about the Internet, the wild enthusiasm of the propeller-heads about stuff that most people don't care about it, and the shameless, ill-informed soapboxing of politicians.

This change will bring with it a profound transformation in the way businesses think about and deal with the world.

For example, the Internet intersects with, and supersedes, much of the traditional publishing and broadcast media.

Rupert Murdoch, the newspaper magnate, was recently wandering around Scandinavia with a large check ($300 million is seriously large), trying to buy up newsprint for his papers. Believe it or not, there is a critical world shortage of this stuff, which makes papers more expensive to produce and, therefore, harder to sell.

The cost of business is killing the *Los Angeles Times*, which is laying off staff and losing money so fast that the term "hemorrhage" seems appropriate.

Is it any wonder that so many media companies are throwing money at new-media — read Internet — opportunities?

Similar shifts are rocking other parts of the business world. In direct marketing, spiraling postal rates and the growing cost of printing have made the catalog companies very interested in delivering their messages and their wares via the Internet.

You can find examples of the move toward electronic commerce in every area of the economy. In response, the Internet business and the surrounding regulatory environment is evolving. An important part of this evolution is telecom deregulation, which is now going to happen (as ill-considered as the new legislation might be).

Deregulation will result in the cable companies, the telcos, the gas companies, the electricity companies — and just about anyone else that has a right-of-way or a way to communicate — selling data connections. And by selling, I mean a bloody fight for business.

It's going to escalate into a consumer market before you can say "price war."

Once the cable companies can supply data services, the consumers will appear. Why? Because television is the predominant information delivery system in the U.S. It is ridiculous to suggest that PCs can ever replace TVs and naive to assume that TVs won't become PCs, as well.

Expect to see smart cable boxes for $300 to $500 within three years. They'll have the great-grandson of the Pentium inside (a working version), megabytes of RAM and gigabytes of disk. They'll be point-and-click to start with (probably using a nasty Nintendo-style controller), and we'll see shout-and-click (AKA voice response) in short order.

Then watch QVC, the Home Shopping Network, Sears, Vons and just about every other large retailer make its catalogs and inventories browsable and purchasable on-line.

Home banking is going to become the norm, just as automated teller machines became the norm. On-line credit cards and electronic transactions are the way, and the entire infrastructure of consumerism will merge with, and then be superseded by, on-line commerce.

Contrary to what some pundits believe, product distribution networks are going to be more important than ever for consumer goods. Why? Because delivery speed will become one of the few differentiators in many markets.
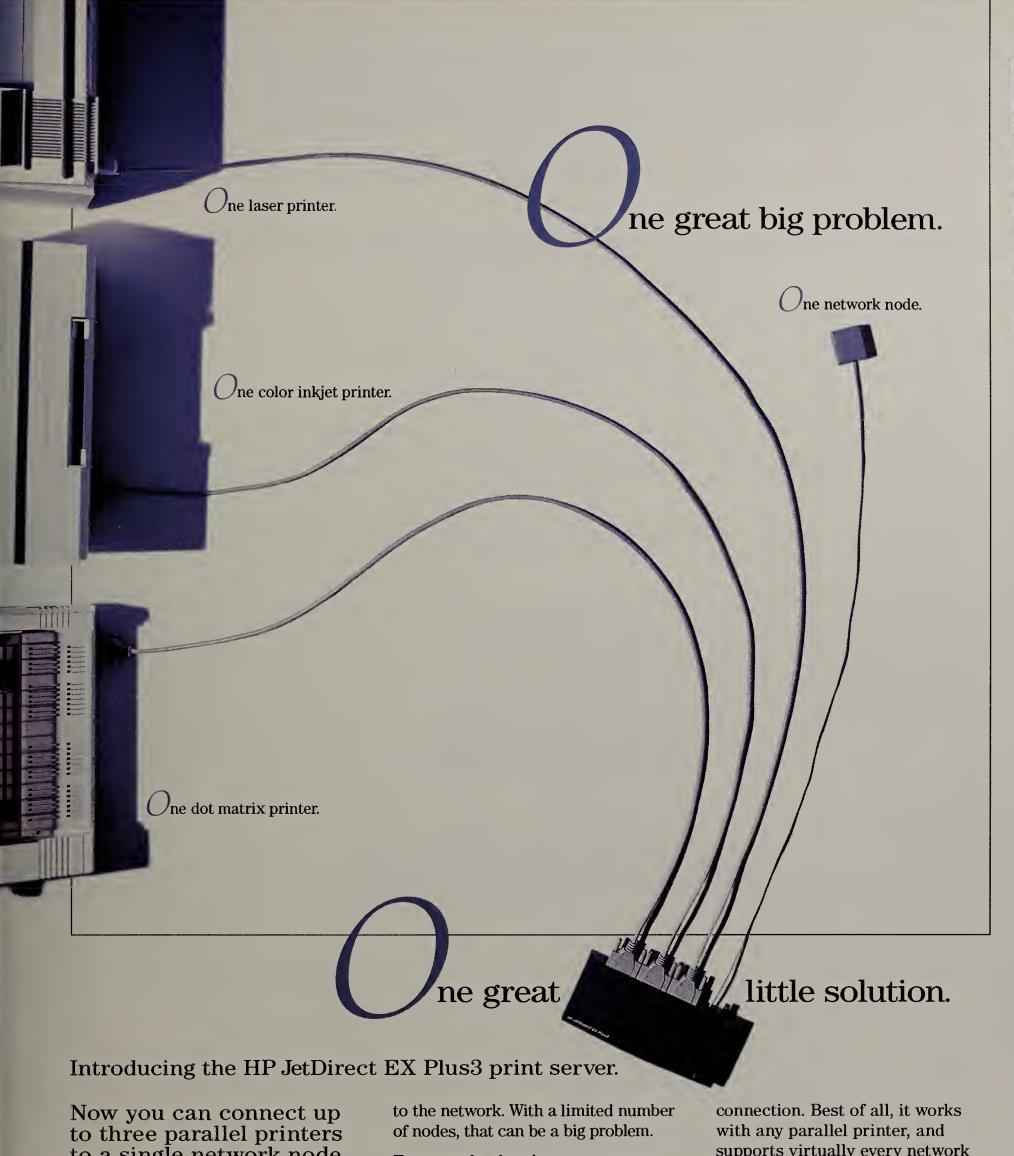
But take note: The consumer base will be able to talk back, do price comparisons without getting out of their TV chairs, complain easily in public forums and, potentially, buy from any seller in the world.

So get ready.

The organizations that recognize the challenges and potential of Internet commerce will prosper in the year 2000 and beyond. The rest will be also-rans.

There's an old saying: If you see a bandwagon, you've already missed it. The Internet bandwagon is coming over the horizon, and it is moving mighty fast. You better be on board by the millennium. ✳

Gibbs is a writer, lecturer, consultant and editorial director for this supplement. He can be reached at (805) 644-4999 or mgibbs@gibbs.com.

Technology Update

Local number portability coming your way

By Terry Jennings

Local number portability has emerged as one of the most hotly debated topics in the telecommunications industry. So why all the discussion?

Simply put, local number portability allows subscribers to obtain local telephone service from any company they choose — without changing their phone number.

Much as they did when alternative providers began offering long-distance services, businesses operating in competitive local markets stand to profit from reduced prices and innovative services.

Even so, recent Gallop polls indicate as many as 90% of businesses would not consider changing local service providers if they had to change their phone numbers. These figures support claims that true competition cannot exist without local number portability.

Today, new entrants in the local phone market have few choices when offering service to a business customer who does not want to change the business' phone number. The most widely available method for new entrants, remote call forwarding, is offered by incumbent local exchange carriers.

This method allows an end user to be served by the new provider's equipment but requires that all calls to the subscriber be switched through the incumbent phone company's equipment before the call is completed.

According to actual test results, the additional switching can delay the call by up to 1.2 seconds. In addition, it makes it impossible for the new provider to offer some features.

For example, a new provider would not be able to offer the Custom Local Area Signaling Service Selective Call Forwarding feature because it uses the calling party's phone number. The calling party's automatic number identification digits are overwritten by the intermediate switching equipment.

Several companies are developing solutions that will route calls directly to new service providers' switches, thereby eliminating the restrictions of the remote call-forwarding method.

Three alternatives are currently under serious discussion in various task forces.

Each alternative is based on the use of either Intelligent Network (IN) or Advanced Intelligent Network (AIN) 0.1, in combination with a local number portability database for the routing information necessary to terminate calls to subscribers who have changed phone companies.

Location Routing Number

In AT&T Network Systems' Location Routing Number (LRN) plan, every switch is assigned a unique 10-digit number that is used to identify it to the network for call routing purposes. One advantage of the LRN solution is that call routing is performed based on today's numbering format.

However, the LRN method requires Common Channel Signaling System 7 as well as changes in SS7 industry standards and fairly significant development in switching systems before it can be deployed. Although LRN will not be readily available in the near future, it appears to be a robust long-term solution.

Carrier Portability Code

In MCImetro, Inc.'s IN/AIN 0.1-based model, each provider is assigned a unique three-digit Carrier Portability Code (CPC)

for every Numbering Plan Area (NPA), or area code, where service is provided. The CPC is stored with the subscriber's directory number in the local number portability database and replaces the NPA during call routing.
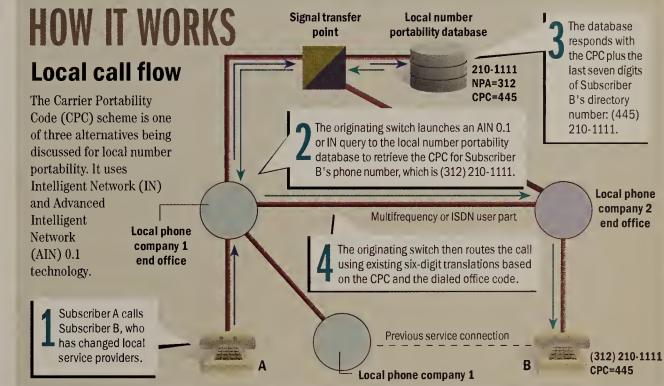
The CPC solution offers several advantages: It can be deployed using IN or AIN 0.1; it can function with conventional interoffice signaling; it requires minimal switch software modification; and it offers transparent end-user feature operation.

The CPC solution has been tested on equipment from AT&T, DSC Communications Corp., Northern Telecom, Inc., Siemens Stromberg-Carlson and Tandem Computers, Inc. It was also chosen by the New York Public Service Commission's (PSC) Local Number Portability Task Force for the Manhattan portion of a state trial scheduled to begin in February 1996.

Name and Address

The Name and Address method proposed by USIntelco and Stratus Computer, Inc. uses one 10-digit number — the number dialed — as a name for a subscriber and another 10-digit number as the subscriber's address, which is used by the network to route the call.

Because the same 10-digit number could be used as both a name and an address, this solution would conserve telephone numbers in the long term. However, it requires SS7 exclusively and significant changes in today's switching features, billing and maintenance systems.

The New York PSC task force chose this model for testing in the Rochester portion of the state trial.

When will this technology be available to business customers? That depends on where the company operates. Some states, such as Florida, already have approved legislation allowing competition for local service without a mandated trial period.

Four states — California, Illinois, Maryland and New York — are studying the local number portability issue in detail. Illinois state regulators have solicited proposals for a 1996-deployable solution, while the New York PSC plans to begin trials early next year.

Other states will likely follow suit once a consensus has been reached in the industry.

Competition will likely drive the creation of new and innovative services in the local exchange market. Local number portability is one factor that will help establish a level playing field for new entrants.

Jennings is a product manager at Siemens Stromberg-Carlson, a switch manufacturer based in Boca Raton, Fla.

HOW IT WORKS

Local call flow

The Carrier Portability Code (CPC) scheme is one of three alternatives being discussed for local number portability. It uses Intelligent Network (IN) and Advanced Intelligent Network (AIN) 0.1 technology.

1 Subscriber A calls Subscriber B, who has changed local service providers.

2 The originating switch launches an AIN 0.1 or IN query to the local number portability database to retrieve the CPC for Subscriber B's phone number, which is (312) 210-1111.

3 The database responds with the CPC plus the last seven digits of Subscriber B's directory number: (445) 210-1111.

4 The originating switch then routes the call using existing six-digit translations based on the CPC and the dialed office code.

Signal transfer point

Local number portability database

210-1111
NPA=312
CPC=445

Local phone company 1 end office

Local phone company 2 end office

Multifrequency or ISDN user part

Previous service connection

Local phone company 1

A

B (312) 210-1111 CPC=445

WHAT A CHARMING HODGEPODGE OF SERVERS, PC'S AND MAINFRAMES YOU'VE GOT THERE.

(MAY WE SUGGEST THE UNIX® SYSTEM
THAT'S BEEN SHOWN TO MANAGE
MULTIVENDOR ENVIRONMENTS BEST?)

Opinions

The evolving NOS

We find ourselves in an era alluded to in the Chinese curse, "May you live in interesting times." This year's new versions of NetWare, Windows NT Server and VINES provide network administrators with an excuse to reevaluate their organizations' networking infrastructure.

But how does one evaluate network operating systems (NOS)? At one time, you simply determined how fast you could access your files on the server.

Today, NOSes provide far more than file and print services. Organizations have learned that integrated services, such as directory, messaging and management, improve administrators' ability to serve their users across the enterprise.

Hoping to provide a little guidance, we took a look at three enterprise players and their respective products: Banyan Systems, Inc.'s VINES 6.0, Novell, Inc.'s NetWare 4.1 and Microsoft Corp.'s Windows NT Server 3.51. We approached each NOS from the point of view of the services it offers in three crucial areas: administration and management, messaging, and directory or domain services. We also threw IBM's LAN Server 4.0 into the mix, while acknowledging it offers no integrated management and messaging services.

We found that, while vendors are all moving toward more of an enterprise view of the network, not all of their services are moving at an equal pace. In this week's review of NetWare 4.1, for example, we found Novell's ManageWise fails to take advantage of the company's enterprise directory services.

Unlike other publications, we didn't just bring the products into our lab and test them in a vacuum. Instead, we went to experts who use multiple NOSes daily and could draw conclusions based on their real-world experiences.

Our Dream Team includes John Allen of Attachmate, Inc.; Tony Croes and Josh Penrod of Currid & Co.; and Howard Marks of TigerTeam.

Each writer looked at a single type of service across multiple NOSes to provide a context for comparison. We then combined their thoughts and presented them NOS by NOS, the way you have to buy them. Although we envision the day when vendors package services that can run under multiple NOSes (as Banyan is beginning to do with its Enterprise Network Services), that day is not today.

We hope this series will become an annual event. We welcome your feedback. How do our opinions match your experience? What can we do the next time to make the reviews more useful?
Lee Schlesinger, Test/Reviews Editor   lschlesi@nww.com

Teletoons

By Phil Frank and Joe Troise
guru@well.com

Workflow standards developers need new rules in an age of electronic commerce

Workflow management and electronic data interchange are two sides of the same coin, but you wouldn't know it from the standards being developed by the Workflow Management Coalition (WMC).

James Kobielus

Workflow management refers to applications that support structured routing and tracking of forms, documents, images and tasks, while EDI enters the picture when these processes involve two or more enterprises.

EDI typically involves the exchange of standardized business forms in electronic formats known as "transaction sets."

Notably missing from the WMC's Workflow Reference Model — a two-year-old framework for standards development — is any mention of the need to coordinate with EDI standards-setting groups such as ANSI X12 or United Nations EDI for Administration, Commerce and Transport (EDIFACT).

WMC has not proposed standard EDI transaction sets for interchange of workflow process models between enterprises. Process models describe workflows as sets of routes, roles and rules for the movement of information and tasks.

Workflow process-model interchange formats are necessary because increasingly fewer critical business processes are managed by a single enterprise. As more work gets contracted out, companies demand greater access into their trading partners' internal processes.

Customers need to be able to track a purchase order, work action or engineering change request across a constellation of linked enterprises. Of course, standards should also provide trading partners with the ability to conceal confidential or unimportant components of their workflow models. After all, there will always be trade secrets.

The principal weakness of WMC's standardization approach is its exclusive focus on workflow processes within a single corporation. With the explosive growth of Internet-enabled electronic commerce, this goal is about as meaningful as re-engineering traffic flow on an exit ramp and ignoring the superhighway that feeds into it.

A good interorganizational workflow process model would spell out such things as completion and acceptance conditions, milestone activities and participant responsibilities — in other words, many of the terms and conditions in a standard business contract.

Model-interchange standards would allow new trading partners to link up their internal operations immediately by installing each other's process logic on their respective workflow management engines.

It's probably asking too much for the WMC — a broad-based consortium of application software vendors — to develop process models for vertical markets as diverse as manufacturing, insurance and transportation.

The principal weakness of WMC's standardization approach is its exclusive focus on workflow processes within a single corporation.

This chore is best left up to industry-specific working groups at ANSI and EDIFACT. The WMC, however, should clearly articulate how collateral standards efforts such as these would fit into its workflow framework.

Another weakness of the WMC's reference model is its failure to address electronic commerce extensions to E-mail and World-Wide Web protocols, which are the services most likely to be used for interorganizational workflow. The model treats E-mail and Web services as passive transport media, rather than as services with the ability to control, secure and facilitate information flows.

Full-blooded messaging-based electronic commerce requires strong authentication, confidentiality, integrity-checking, acknowledgment, notification and nonrepudiation services, most of which are supported under the Privacy Enhanced Mail (PEM) and X.435 protocols.

The WMC should strongly consider providing hooks to PEM and X.435 events within its proposed process definition and workflow-enactment service standards.

By doing so, it will be providing workflow administrators with a global, detailed, meaningful view of the processes that occur not only within a single company but also between companies.

Many production workflow environments are hubbed around shared file-store environments, which pass electronic documents plus the applications needed to launch them from user to user.

The Web is quickly becoming the preferred filestore for electronic commerce, superseding vendor-specific environments such as Lotus Development Corp.'s Notes, which are typically devoted to intraorganizational applications.

The WMC should waste no time in defining a unique role for the Web — and associated Internet mail, file transfer, security and other services — in the workflow universe.

Addressing workflow's tendency to overflow its boundaries within companies — especially as it concerns the Internet — would increase the visibility, relevance and marketability of the WMC's standards work.

Workflow vendors would have a blueprint to address the fast-growing electronic commerce marketplace.

To date, the workflow industry, because of its intraorganizational focus, has been linked primarily to business process reengineering, a substantial market but not really a barn-burner.

Workflow management environments will help us control the pace and rhythm of electronic commerce, if we can get them linked up over the 'Net.

Kobielus, a contributing editor to Network World, is a senior telecommunications analyst with LCC, Inc., an Arlington, Va.-based network design and engineering firm. He can be reached at (703) 807-5075 or via the Internet at kobielus_james@lccinc.com. The opinions expressed are his own.

Opinions

IN-BOX

Win95, OS/2 battle continues

Editor's comment: Our review comparing Microsoft Corp.'s Windows 95 and IBM's OS/2 Warp Connect (Aug. 21, page 43) generated lots of feedback, mostly from OS/2 proponents. Here's a sample of the letters we received covering points various readers brought up, followed by a response from the authors.

Kristin and Howard Marks have put their credibility at stake with this article. Their consulting firm, TigerTeam, specializes in migrating clients to 32-bit operating systems. But the article reads as if they had never installed OS/2 before.

That is beside the point, however. Comparing OS/2 and Windows 95 is like comparing apples to oranges. A better comparison would have been between OS/2, Windows NT and Unix/X.

Windows 95 should have been compared to Microsoft's Windows for Workgroups and Apple's System 7.
Cameron Miller
Network administrator
Apex Microtechnology
Tucson, Ariz.

Much of the information on OS/2 Warp Connect in your NetResults table is flat out wrong.

The table states memory available for DOS applications running on OS/2 Warp Connect is 499K bytes. It is 587.5K bytes, and even 678.2K bytes if you load the DOS and Command Processor in high memory and use upper memory blocks. (This is total memory available: Your table is unclear whether it is stating total or lowest memory available).

The price in the table is also wrong. It's not $299, but $145 minus a $25 rebate (to install over DOS and/or Windows) or $189 minus a $50 rebate (includes DOS and Windows support).

Did Microsoft help you write this article?
John Bahr
Systems engineer
Aartronics Corp.
Denver

I appreciate what you attempted to do with the article, but I believe there are numerous errors or misleading statements.

While Windows 95 may have some network administration tools bundled with it, they are not integrated with Systems Management Server (SMS) or any other management platform. So, for the home user, it's useless, and for larger corporations, SMS or some other management platform would be better.

There are plenty of management tools available to remotely administer and manage Warp Connect clients.

I also disagree with your assertion that Warp Connect lacks integration of critical components such as Novell, Inc.'s NetWare Requestor. Resources from any of the server platforms are all universally available to any session in Warp Connect.

Regarding your installation problems, I am not sure what you did, but Warp Connect and Communications Manager can be installed in about 40 minutes on a 486-based 33-MHz PC with 16M bytes of RAM. This can be done using a charge integration device server (no CD-ROM required).

I couldn't agree more with your claim that Warp Connect does not do a great job on automatic detection of hardware, but to be honest, I have had just as many problems with Windows 95. Both systems have a long way to go in that respect.

I admit Warp Connect has its share of warts. But anyone who states that Windows 95 is a better choice for mission-critical enterprise deployment over Warp Connect clearly does not understand the capabilities of Warp Connect or has bought too heavily into Microsoft's hype.
Frank Giordano
Client/server architect
Southbury, Conn.

In your comparison of Windows 95 and OS/2, you indicate that OS/2 has lower performance than Windows 95.

My experience with the two has been that OS/2 runs DOS programs faster and more reliably than Windows 95, and, of course, runs OS/2 programs faster than Windows 95 does (which doesn't run OS/2 programs at all).

You also left out a major issue — reliability. Windows and Windows 95 are not stable. Every Windows system we have used has crashed, on average, two times a day under heavy use and required hardware resets. Most OS/2 machines tend to be much more stable if installed and configured properly.

Your claim that OS/2 Warp Connect took 3 hours to install, while probably true, is not the case when it is installed by experienced users. The last Warp Connect system I installed took about 15 to 20 minutes, not including the installation of any applications.
Steve Rainwater
President
Network Cybernetics Corp.
Irving, Texas

Was your comparison of OS/2 Warp Connect and Windows 95 really fair? You seem to know a lot more about Windows 95

and are fairly new to OS/2.

Some points that you missed were that OS/2 Warp Connect will upgrade Windows applications into its Workplace Shell. This option is available during and after installation from the system setup folder.

You mentioned that OS/2 Warp does not have the capability to store the individual user settings for Windows 95 in a central location, allowing users to log on to different workstations and have access to their familiar desktops. Well, on the back of the OS/2 Warp Connect box, it states: "Set up multiple desktops for yourself, your family, or coworkers."

OS/2 Warp does not have Windows' artificial limitation of three printer ports. I have 30 different printers in my printers folder, all attached to various printers across my LAN and my client's LANs. I just choose which printer I want to use via a simple point and click.

One of OS/2 Warp's major strengths is the Internet connection tools that it offers. For example, WebExplorer under OS/2 has all the features that Netscape Navigator does and some that Netscape lacks. You failed to mention all the other Internet tools that come with OS/2 Warp, like the graphical FTP, telnet, Archie, E-mail and Gopher utilities.

Also, the one-button Internet access is available from IBM and other Internet providers. Microsoft's one-button Internet connection is only provided via Microsoft Network.

You did not mention any OS/2 third-party or IBM software solutions for OS/2's shortcomings. For example, many of the network management functions that you mention as being available for Windows 95 also are available for OS/2 Warp Connect. However, unlike Windows 95, the clients for this functionality do not happen to come with OS/2 Warp Connect.

You did not mention other components of OS/2 Warp Connect that Windows 95 lacks. Examples include Lotus Notes Express, Person-to-Person, the Unix daemons that come with OS/2 Warp Connect's TCP/IP suite and LAN Distance, which allows for remote logons into any network.

I agree that the NetWare tools are not as well integrated as in Windows 95. This is one of the regrets I have about OS/2 Warp. However, I would take this one regret over the many regrets that Windows 95 presents, such as lack of preemptive multitasking, lack of memory protection even in 32-bit Windows 95 applications, and lack of

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NOVELL
solves vision

By David Buerger

N o one can accuse Robert Frankenberg of thinking small.

Novell, Inc. named Frankenberg president and CEO in April 1994, and crowned him chairman four months later. He hit the ground like a cyclone.

A year later, the former Hewlett-Packard Co. executive has cleaned house and installed his own team of seasoned turnaround artists, slashed head count after merging with WordPerfect Corp., reorganized Novell, created a business plan and forged a new strategy.

That vision, called Pervasive Computing, may be Frankenberg's greatest legacy to Novell.

Forget Microsoft Corp., IBM, Lotus Development Corp. and other predators that seek Novell's terrain. Frankenberg saw that Novell's greatest enemy was itself. His vision and insistence on process-oriented management mark the first time Novell's generals and soldiers have marched to a rational business plan.

The $2 billion networking company was bereft of a clear direction several years before Frankenberg's watch. Former Chairman Raymond Noorda's mantra of "grow the industry" worked fine in the company's heyday. That is when one good product — the NetWare network operating system (NOS) — coupled with good distribution and the luck of timing, pro-

pelled Novell to the top. Demands of sophisticated users and industry maturation, however, outgrew Noorda's leadership.

Frankenberg's pragmatic, business-oriented approach is different. He knows that Novell's future hinges on convincing users and investors that Novell has a growth plan and is on track.

Objective: the world

Pervasive Computing, according to Frankenberg, is "connecting people with other people and the information they need, enabling them to act on it, anytime, anyplace." Specifically, Frankenberg wants to

FRANKENBERG'S NEW TEAM

Name: Steve Markman

Title: Executive vice president and general manager of Novell's Information Access and Management Group

Key goals: Leads Novell's charge into Internet services and mobile computing. Markman seeks to establish Novell as a LAN management leader.

Past experience: 29-year veteran of AT&T, HP and NET

Name: Sheldon Laube

Title: Executive vice president and chief technology officer

Key goals: Laube's mission is to synchronize Novell's numerous technology efforts to provide a uniform message for Pervasive Computing.

Past experience: Price Waterhouse, director of information and technology

Name: Joe Marengi

Title: Executive vice president of worldwide sales

Key goals: Marengi must educate the direct sales force and indirect sales channel about how products fit the company's new vision.

Past experience: Excelan, director of channels

Name: Richard King

Title: Executive vice president and general manager of Novell Systems Group

Key goals: Novell, under King, must establish embedded systems technology for Pervasive Computing to succeed, and King must establish UnixWare as a force alongside NetWare.

Past experience: Lytron Systems, vice president of R&D

Name: Christine Hughes

Title: Senior vice president of corporate marketing

Key goals: Hughes needs to devise a strategy to clearly articulate the Pervasive Computing message and position products under that banner.

Past experience: Xerox, vice president of integrated marketing

Name: Jeffrey Waxman

Title: Executive vice president and general manager of Novell's Applications Group

Key goals: Waxman must establish Novell's GroupWise as an effective rival to Lotus' Notes while also spearheading the launch of a new consumer products division.

Past experience: 15-year Xerox executive

CEO Bob Frankenberg

has installed a team

of turnaround artists

and set the course for

Pervasive Computing.

puzzle

CAROL SCHWEIGERT

build a universal network that links one billion devices by the year 2000.

"You have to set aggressive goals to motivate people," says Sheldon Laube, Novell's new executive vice president and chief technology officer. Frankenberg enticed Laube, 45, to leave Price Waterhouse, where he spent 10 years building a network of 30,000 PCs in 110 countries.

Now Laube is a missionary who has become the pivotal player when it comes to putting Novell's technical teams in sync. "I sensed an incredible opportunity to change the way the world works through networking," he says.

One billion devices includes all sorts of gear, such as PCs, fax machines, televisions, smart telephones and intelligent appliances still on many drawing boards.

Novell aims to play a central role in this meganetwork. A new version of NetWare and its directory service would be the traffic cop, forging connections between devices and deploying network-intrinsic applications that provide utility services to users. Hundreds of millions of people would use those applications. In many cases, Novell's products would help adjust and monitor the performance of electrical devices without human intervention.

The company has developed NetWare Embedded Systems Technology (NEST) for just that purpose (see story, page 59). NEST enables companies to wire physical plant processes and other activities more deeply into information systems to gain greater controls and economies.

Novell has also brought existing products, such as its GroupWise offering, under the Pervasive Computing umbrella. GroupWise, formerly known as WordPerfect Office, is an electronic mail package with built-in calendaring and scheduling that is all tightly coupled to Novell's NetWare Directory Services. Users across the enterprise will be able to locate one another or other resources due to the shared-directory structure (see story, page 59). That's an application focus on coordinating people, processes and information flow that is sure to appeal to many network administrators.

Details on Pervasive Computing are still vague.

Novell promises to articulate a crisp road map for its vision in two weeks at NetWorld+Interop.

Frankenberg's original notion targeted one billion people, not devices. At one-sixth the world's population — most of which lacks electricity, much less any form of technology — that goal was too fantastic. Even a billion devices, however, is a big leap from Novell's current base of about 50 million users. But Novell will have help.

"Pervasive Computing isn't unique to Novell, but it speaks to the shift from the desktop to the network," Frankenberg says.

Adds Steve Markman, executive vice president and general manager of Novell's Information Access and Management Group, "It's a vision for the whole industry, of which we're an important player. We think we can take the world into a realm of more intelligent network services."

Markman is a 29-year veteran of AT&T, HP and Network Equipment Technologies, Inc. While at HP, he worked for Frankenberg and turned around one of the company's business units. Markman now heads a $250 million unit on which Novell pins substantial growth. Its product lines include software for managing Novell networks, mobile computing, hooking NetWare LANs to host computers, telephony applications and links to the Internet.

"I expect my group to be a third of the company when we reach $5 billion in revenue," Markman says, but he would not predict an attainment date.

Markman, who joined Novell in August 1994, likes the company's potential and new leadership. "We've got very good people with good business skills; they're aligned with the new vision, they're excited about it," Markman says. "As a team, we've come together very

well, particularly in the last few months."

The catalyst to implement Pervasive Computing is Frankenberg's emphasis on process planning throughout the company.

"When Novell was a one-product company, the process was Ray Noorda. With multiple products, we have to pay more attention to managing them and to business planning," Markman says. "Now the process is a team of people working very closely together."

Says Toby Corey, vice president of marketing for Novell's Operating Systems Division, "Traditionally, we did a lot of 90-day planning. Now our requirements are three-year business plans."

Joe Marengi, executive vice president of worldwide sales and a veteran Novell employee, adds, "We just made the quantum leap from an immature growth company to a mature, process-oriented company. Large customers expect that maturity."

Novell's *Frankenberg knows that the firm's future hinges on convincing users and investors that Novell has a growth plan and is on track.*

Application hook

Novell aided its discovery of process management benefits by heeding its own advice. "Frankenberg saw that we had lots of different E-mail systems in-house," Marengi says. "So we standardized on our own GroupWise product. It changed

Total multi-vendor chaos incompatible protocols inflexible systems inaccessib

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Novell hopes to replicate its self-conversion to GroupWise and other networked applications as part of Pervasive Computing.

"Applications are the vehicles for information," says Jeffrey Waxman, executive vice president and general manager of Novell's Applications Group, who joined the company last June. Networks bring little value to users without information provided by networked applications, he says. Pervasive Computing's aim is for everyone to use networked applications as part of daily life.

Waxman's group includes Group-Wise, the PerfectOffice suite of WordPerfect productivity applications and a new consumer products division. Prior to joining Novell, Waxman turned around several small companies and was a 15-year

Xerox Corp. veteran, where he worked with Christine Hughes, Novell's new senior vice president of corporate marketing. That's where he first did business with Frankenberg.

When he is not fishing for trout or angling for bigger catches in his North Carolina-based 54-foot custom sport cruiser, Waxman is glowing over his group's potential. "I'm the only application business in the industry with a captive audience," he says. "I have a huge business — if I can provide an optimized application vehicle to convey information to network users. Novell is a sleeping giant."

That potential lured former Chairman Noorda to merge with WordPerfect in 1994. WordPerfect's acquisition, however, has shown no tangible fruits, according to analysts.

The sore spot is PerfectOffice. Revenue from Novell's personal productivity software fell in

the third fiscal quarter to $88 million from $135 million a year earlier. Novell's 8.5% market share in that sector pales to Microsoft's 85%.

Frankenberg blames the revenue drop on users waiting for Microsoft's Windows 95 operating system. According to Novell, it will ship a version of PerfectOffice for Windows 95 late this year.

Novell also lacks software to counteract Microsoft's BackOffice product. A glaring hole is strong client/server database software, which means Novell must rely on third-party solutions.

Ultimately, the company will group- and network-enable all its applications, transforming them into network services, Waxman says. And it will make all its applications easier to use during the next fiscal year, which runs from November through October. First on tap is a common installation procedure and documentation, according to Markman.

The other application sleeper is GroupWise, which contributed just 5% to Novell's overall revenue during 1994. Since then, GroupWise has doubled its number of users to 4.5 million — the biggest market share of any workgroup software package, according to Novell.

The company intends to soon add conferencing and workflow features to compete with Lotus' Notes software.

"Our entire product mix will, over time, become network operating systems and networked applications," Frankenberg says. He believes Novell has the opportunity to take the lead position in the groupware market by the end of 1997.

"I'm skeptical," says Lenny Pitts, a research analyst at Workgroup Technologies, Inc. "Novell is playing catch-up to Microsoft and Lotus, who are also team-enabling their applications."

Novell's traditional customer, the network manager, is also skeptical of the company's new emphasis on applications.

Thomas Moon, network manager for Ryte-way Industries, Inc., a Northfield, Minn.-based contract packaging company, voiced a common reaction. "Novell should stick to what it does best — network operating systems and connectivity," he says. "There is no need for them to keep up with the Microsofts. Novell has a fine product and should work at making it better, not grow into other areas."

Such reactions partly stem from industry maturation and complexity. Networking no longer revolves strictly around the network manager, who now

sits on a team of corporate specialists tasked to engineer businesswide solutions. NetWare may lead NOS sales, but NOS buyers are not the sole buyers of applications.

Novell's presumption of a captive application market is, therefore, questionable, especially given Microsoft's dominance in this arena. Drawing these different camps together to create Pervasive Computing will require a clearer message and a new level of ingenuity from Novell.

Building on NetWare

Before WordPerfect's merger with Novell, NetWare contributed over 80% of the company's revenue. NetWare now chips in less than half due to Novell's broader product line. It's a crucial half, however, because NetWare is the foundation for most products sold by Novell.

NetWare dominates server operating system sales, although that share has dropped from nearly 70%. NetWare's share of the application and network server market was 43% during 1994, according to Rob Enderle, an analyst at Dataquest, Inc. Framingham, Mass.-based International Data Corp. (IDC) pegs NetWare's share of users in the advanced server market at 50% for the first half of this year, according to analyst Lee Doyle. He says Microsoft's Windows NT placed second, with an 18% share.

NetWare 4's first release in

March 1993 was rejected by most users due to bugs. "NetWare 4.0 was a black eye in the marketplace," Corey says.

Novell revamped the product and released Version 4.1 in December 1994. Users gave that release a better reception. According to Corey, NetWare 4 contributed less than 5% of Novell's total revenue during fiscal 1994. That grew to 24% for the quarter ended July 31, or 18% year to date. He adds that NetWare 4.1 sales are now equally split with Version 3.12. He predicts that more than half of the customers using NetWare 2 or 3 will switch to the new version by December 1996.

Corey's division is part of the NetWare Systems Group, which also makes Tuxedo transaction processing software and NetWare application development tools. The group still sports a familiar lineup of managers led by Richard King, the Brigham Young University computer science graduate who joined Novell in 1985.

King, a soft-spoken technical guru of few words, holds high respect from his staff and customers. He needs it, as he has two key initiatives under his watch.

One is NEST, software that is crucial to achieving Frankenberg's billion-device vision by the year 2000 (see story, page 59).

And King was recently charged with the daunting task of merging the traditional Net-

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Technology components required to achieve Novell's vision of Pervasive Computing

Applications
Programs must take full advantage of network services to enable users to access data, communicate and collaborate across the net.

Tools and APIs
A stable set of interfaces and advanced tools required to enable application developers to create packaged network apps and allow users to customize their apps.

Access
Desktop computers, notebook computers, PDAs, telephones, TVs, pagers and other intelligent devices that simplify local or remote access to network resources, including legacy systems.

Network services
Operating systems services, which are distributed across multiple platforms and made available to users, applications and developers to facilitate efficient use of the network.

Management
Intuitive and reliable systems management, which must reduce the costs and complexity of managing this universal computing environment.

Infrastructure
Basic network and server operating systems required to connect services and run network applications.

SOURCE: NOVELL, PROVO, UTAH

Cellular stock price dulls Novell's luster

I f Novell, Inc.'s products are so good, why have investors turned thumbs-down on the company's stock?

The share price dived 30% after Novell acquired Unix System Laboratories, Inc. (USL) in June 1993 and stayed at historic lows, despite a booming technology market. Its high point was $35.25 per share; the stock closed at $18.81 last Wednesday.

"Novell has not delivered as much sales growth as people would like," says Chuck Phillips, software industry analyst at Morgan Stanley & Company, Inc. in New York. "Margins have been generally good, but people would like to see explosive revenue."

Revenue for the third quarter ended July 29 was $538 million, up 10% from the same period last year. Year-to-date revenue of $1.56 billion is up 9% since 1994.

"We've been making business decisions that reflect our view of the longer term requirements of our customers," explains Robert Frankenberg, chairman and chief executive officer at Novell.

Novell generated nearly $100 million per quarter in cash flow during the past two years, despite charges for its USL acquisition and WordPerfect Corp. merger. Investors pocketed none of those profits, however, because Novell pays no dividends.

The company uses cash for acquisitions and to fuel other growth, according to Peter Troop, Novell's director of investor relations. Cash and short-term investments as of July 29 was $1.23 billion. Novell has no long-term debt.

Frankenberg says operating margins moved from 16% in 1994 to near 25% this year, causing faster growth in income than revenue.

While analysts blamed low share prices on Novell for buying slow-growth companies such as WordPerfect, Novell executives blamed themselves for not marketing the company and its strategies to Wall Street firms. "We think the combination of having a solid corporate strategy, telling it and delivering products will boost the stock price," says Jeffrey Waxman, executive vice president and general manager of Novell's Applications Group.

DON'T FORGET R&D

Novell is spending **17.5%** of its revenue on product research and development.

A Forrester Research survey of users' application server preferences for 1996 finds that 46% will use Unix; 20%, Windows NT; 4%, NetWare; and 30%, undecided.

Unix **46%**
Windows NT **20%**
Undecided **30%**
NetWare **4%**

Ware operating system with UnixWare. Novell acquired master rights to Unix when it purchased Unix System Laboratories, Inc. in 1993.

Unix is favored by large users for running client/server applications such as transactional database systems. Yet Novell's UnixWare brand has been a flop.

"Getting the sales channel to switch from other Unix vendors has not been easy," Marengi admits. Novell's failure to articulate a clear Unix strategy has not helped. When asked which product Novell recommends to users as an application server — NetWare or UnixWare — he waffles. "Salespersons are trained to recommend whatever the customer's choice is," he says.

Novell's independent software development partners are not as equivocal and noted several concerns.

"NetWare cannot support large corporate applications, such as a stock trading system," says Jeff Smith, senior manager of business development at Sybase, Inc. "NetWare doesn't have the fault tolerance needed, nor is Novell set up to support those types of organizations."

Adds Ron Harris, president and CEO of Btrieve Technologies, Inc., "We are not big proponents of NetWare as an application development platform. NetWare is a world-class file-and-print platform. But we don't use Novell's Application Loadable Module software to

develop on NetWare." Novell, which owns a minority share of Btrieve, bundles that product with NetWare.

"It's very hard to develop for NetWare. You must pay attention and be sharp," says Yuda Doron, executive vice president and general manager of Cheyenne Software, Inc.'s NetWare Division.

Meanwhile, Microsoft's Windows NT is gaining ground as an application server. "The large majority of Fortune 500 shops are considering NT," says Christopher Germann, an analyst with Gartner Group, Inc.

"I do not see how Novell can stop NT from happening," says Tomas Hernandez Jr., director of computer services at Kohn Pedersen Fox Architects in New York. "Novell blew it. With Microsoft's mature alternative, it's over."

Says Rick Howard, assistant computer support director for the Department of Electrical Engineering and Computer Science at the U.S. Military Academy, "NT is the winner because it's what Unix would have been if it was designed in the '90s." Howard's department is also a big Unix proponent. "We have been around Unix all our careers, and we're used to it. For most of us, NetWare was never in the picture."

SuperNOS to the rescue

Novell hopes to quell this dissent with SuperNOS, a future operating system that blends NetWare and UnixWare. That merger will please NetWare users with high-end applications, mainly because APIs will work on either platform. Novell will then be able to steer heavy-duty applications onto UnixWare. But

SuperNOS — code-named Gemini — is still in Novell's labs and will not ship to customers until the end of 1996, according to Corey.

Sales chief Marengi dismisses SuperNOS: "It's not important because we can't sell it." Laube, however, hints that SuperNOS will resolve Novell's dilemma by breaking the link between the physical and logical networks. "The message will change once we have that product to sell," Laube says.

Widening access to Novell's directory service is another goal for SuperNOS. Lotus Notes, for instance, requires its own directory and security information — duplicated from similar information on the network server. Allowing developers to rely on the operating system for those elements would thus speed the creation and ease the management of client/server applications.

"This utility will arrive well before the Gemini project," Corey maintains. He says Novell's ultimate goal is to merge network and application servers into one box as hardware vendors ship more powerful servers, enabling them to function just like a mainframe.

And as for Gemini's product name, Corey says it is not inconceivable that it would be called NetWare 5.

Big challenge

Can Novell pull off Pervasive Computing? "Novell's new management is more aggressive and in touch with the end markets," says Chuck Phillips, software industry analyst at Morgan Stanley & Company, Inc. "They have a reasonable chance at achieving the vision, but they must move much more quickly."

Adds Gartner Group's Germann, "The vision is on the mark, but Novell is missing a few tactical product opportunities, such as asset management."

IDC's Doyle says Frankenberg's moves have been positive, but Dataquest's Enderle was more critical: "Novell doesn't have a next-generation NOS, and SuperNOS is too far out."

Users and development partners were more upbeat about Pervasive Computing but say Novell could not pull it off without strong partners. Microsoft declined to comment.

"Our biggest strength is being perceived as the biggest networking company," Novell's Marengi says. "Our installed base and networking products give us the opportunity to springboard ahead."

Other executives placed pre-

Snaring a billion networked devices

NetWare Embedded Systems Technology (NEST) is the only way Novell, Inc. can meet CEO Robert Frankenberg's Pervasive Computing goal of one billion devices on NetWare LANs by the year 2000.

The company sells NEST software developers' kits to manufacturers of anything that plugs into an electrical socket. Fax machines, copiers, telephones, set-top cable television boxes, utility meters and vending machines are just a few examples of the type of gear Novell hopes to bring under the NetWare eye.

Even automobiles are a potential target host for NEST applications.

NEST has struck a chord with office products manufacturers. About 25 vendors have snapped up the $50,000 developers' kit since it shipped in February.

Novell has 20 other NEST partners and claims 75 additional deals are on tap.

The company expects about two dozen NEST devices will be available by year-end.

A basic NEST-enabled application would allow a user to simultaneously send documents to electronic mailboxes, printers and fax machines.

But there are also applications that mostly focus on process control. Andover Controls Corp., for instance, expects this month to ship a NEST-enabled building controller. The device will allow physical plant managers to remotely monitor and manipulate room temperatures.

Variations of a few degrees could save a large physical plant thousands of dollars on utility bills.

Can NEST deliver a billion nodes? Count the number of electrical devices in your business, then multiply the sum by 6.2 million U.S. business establishments.

Next, count the electrical items in your house and multiply that sum by 95 million households.

Those figures are just for the U.S. Frankenberg's vision might not be far off the mark.

Revenue rundown

Novell's revenue split for 1994

- NetWare 46%
- Business applications 25%
- Education & services 4%
- Groupware 5%
- Unix 9%
- Connectivity & management software 11%

Directory service is on a roll

NetWare caught on in the 1980s largely because it worked with virtually any hardware. NetWare may catch its second wind this decade due to NetWare Directory Services (NDS) software, which eventually will let users tap into applications residing on different operating system platforms.

Network managers couldn't figure out how to use NDS when it first shipped with NetWare 4. But it's come a long way since then. Now NDS underpins Novell, Inc.'s NetWare marketing efforts, especially against rival Microsoft Corp.'s Windows NT Server. NT Server uses a domain-naming service, which Novell says will not scale well on very large networks, unlike its NDS.

NDS is also the framework for Novell's and partners' application development plans to integrally link every resource to the network.

"A year ago, people asked, can I buy NetWare 4 without a directory service? Today they ask, why can't I get into an NDS [training] class?" says David Eckert, director of portable directories at Novell's BrainShare technical conference last March.

NDS turned out to be the hottest thing going for NetWare because it makes using and managing large networks easier. A person can log on to the network once and use resources on any server — without separate logons.

The master directory also eliminates the need to maintain duplicate directories for the network, electronic mail and other net applications.

"We'll be linking NDS to the Internet and organizing Web information behind NetWare objects to cut out arcane addressing," says Steve Markman, executive vice president and general manager of Novell's Information Access and Management Group.

The first step in NDS evolution will be providing directory service for the AT&T NetWare Connect Services (ANCS) network early next year. Eventually, Novell will unbundle NDS from NetWare, enabling the directory to work on UnixWare and with other operating systems and applications. Microsoft plans a similar strategy for its new Open Directory Service Interfaces, but observers say Novell has a two-year development lead.

NDS has always been tightly coupled to NetWare security features, so separating the two may expose NetWare's security scheme to third parties. The separation is a top priority, however, because it plays a key role in ANCS.

IN A QUIET CORNER *of southwestern Ohio,*
the conflicting pressures of medical care and
medical cost are being worked out
in a very healthy way.
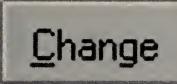
Thanks to a new Health Data Network,

doctors in seven Dayton area hospitals are
now spending more time with patients, and
almost no time looking for records.

The network, spearheaded by IBM, lets
authorized doctors look up medical histories

within seconds, no matter where their
patients were treated. Test results are also
included, so repetitive testing has dropped

In all, the network is helping the
Greater Dayton Area Hospital Association

Change

miums on Novell's technology, partnerships with other hardware and software vendors, and distribution channel. "Our channel is the envy of the industry," Markman says.

Novell's success clearly depends on Frankenberg and how he motivates Novell's employees. The 48-year-old general is popular with his 7,600 soldiers. "Bob is the best business person I know of in the industry, ahead of Larry Ellison at

Oracle and Bill Gates at Microsoft," Waxman says.

Adds Markman, "Frankenberg's calm manner allows people to speak their minds and encourages expression. That's different from the prior management style of 'I'll make all the decisions.'"

"His style is reminiscent of HP's: he gains consensus from people, then strategy, then he gets out of the way," Waxman says. "He's not someone who will come down and demand we do things his way.

Frankenberg's a normal person — probably the only senior executive at this level who's not certifiably nuts."

Frankenberg's levelheaded nature is just what the doctor ordered. The last few years were difficult for Novell employees. "A year ago it was really tough here," Corey says. "Heads were down, people were wondering how the new management would work together."

But Pervasive Computing has blown out the doldrums and given Novell's

troops new life. "Excitement is coming back to the company," Corey says. "It's a different environment. Now we'll see how well Bob placed his bets."

Buerger is a contributing editor to NW and an Atlanta-based industry consultant. He can be reached at dbuerger@pipeline.com.

The Internet for the rest of us?

Novell, Inc. is eschewing the Internet and pushing NetWare Connect Services (NCS) to help business customers extend LANs into national and global networks.

Think of NCS as a commercial information superhighway under construction. Novell will supply NetWare services; for instance, NetWare Directory Services will act as the directory.

Telecommunications suppliers will furnish the data pipes.

Novell's first partner is AT&T. The giant long-distance provider is testing its leg of the highway, called AT&T NetWare Connect Services (ANCS), with three beta users. ANCS will move into a controlled introduction with 20 customers in October, according to Steve Markman, executive vice president and general manager of Novell's Information Access and Management Group.

The company also plans to offer NCS through regional Bell operating companies, cable television companies and foreign post, telegraph and telephone administration companies, although Markman says it will take a while to ramp up large numbers of users. "Most PTTs expect four or five years to generate the big numbers," he says.

According to Novell, NCS is better than the Internet for electronic commerce, especially between business partners, because it's more reliable and secure.

But at Novell's BrainShare conference last March, skeptics questioned the network's security and wondered out loud where fingers would point when connections broke. The responding mantra from Jim Pasquale, Novell's senior product manager for ANCS, was, "Trust me. You've got to trust Novell and AT&T. Without your support, this won't work."

Apparently, it's not working as fast as Novell and AT&T had planned. Pasquale said in March that the "flood gates would open" by the fourth quarter. That goal slipped to January, according to Markman.

NetworkWorld

Novell's Enterprise NOS

With NetWare 4.1, Novell grows up from its workgroup roots.

Network World
TEST ALLIANCE
NOS review series
— Part I —

**By John Allen,
Tony Croes,
Howard Marks
and Josh Penrod**

While Novell, Inc. owns the market share lead in the network operating system arena, its latest release of NetWare, Version 4.1, is the company's first product to provide a robust, scalable directory service, integrated messaging, and server and network management tools for administrators.

We found NetWare Directory Services (NDS) to be a conceptual leap for those familiar with NetWare 3.X binderies, but a powerful tool for managing objects across the enterprise. NetWare's messaging options are evolving and will soon be on par with the upcoming Microsoft Corp. Exchange Server and Lotus Development Corp. Communications Server. NetWare's management tools, while integrated with the other services, are a relative weak point because of their server-centric orientation.

Enterprise directory

A directory service translates unique network names into unique addresses. It is a naming scheme that applies to all network items such as users, printers and file servers, and its information is distributed throughout the network.

To both the end user and network administrator, a directory allows the network to appear as a single unit instead of a collection of servers. For the user, logon occurs only once to access the data, applications and services to which the user is entitled. For the administrator, there is now one central location to manage.

NDS is a true enterprise directory service, with a replicated, distributed, hierarchical architecture independent of any single server — and, thus, with no single point of failure. However, Novell had to ensure that the product remained compatible with its existing base of NetWare 2.X and 3.X installations. The result is an interesting mix of new technology saddled by constraints of the old; however, this mix allows those who want to make a gradual shift to the 4.X environment to do so.

Novell's naming hierarchy may be as many as 15 levels deep, in contrast with Banyan Systems, Inc.'s StreetTalk directory service's three-level names based on user, group and organization. Administrators must take care to design the name space so that names are not so long as to make them unusable for the average user. This is simple enough to do; administrators can set a default location in the NDS tree, known as a context, in the NET.CFG file to hide name complexity. (This is similar to a logon group search list in VINES, which is set up in the PCCONFIG utility.)

Novell designed NDS to hold about 16 million entries per server, which means about 30,000 to 40,000 users, depending on how many entries and attributes each user has set up.

NDS's naming design is very similar to X.500 conventions, with the inclusion of naming levels such as country and state. There is no service to tie into any outside X.500 services, but that should not be a difficult step, assuming that the NDS database is set up correctly.

NetWare 4.1 comes with both a DOS-based (NETADMIN) and a Windows-based (NWADMIN) administrative program to manage the NDS database. With these programs, administrators can easily add, edit and delete NDS objects from the directory tree.

Under NWADMIN, attributes for the various objects can be edited by simply double-clicking on the object, which brings up an edit dialogue (see Figure 1, page 64). Administrators can change standard items such as name and password, as well as additional items such as phone numbers and addresses. This is the beauty of NDS: the ability to manage from afar — the next building, city, state or continent. The network is distributed, but control of the tree does not have to be.

Highly available

The NDS database can be split into replicas and placed on different servers. Any section of the database can be replicated to provide layers of redundancy. If a server that contains part of the NDS database goes down, a replica of that section on another server can take over until the first server comes back on-line. This partitioning can either be automatic or explicitly controlled. Organizations with WAN links will want to make sure that all information is on both sides of the link in case it should fail.

Novell provides four types of replicated partitions: master, read/write, read-only and subordinate reference.

Master partition replicas, of which there can be only one for each partition in an organization, are the main partitions and typically the first ones referenced.

Read/write replicas are similar to masters, but there can be many of them for each partition. Read-only replicas are self-explanatory, and subordinate reference replicas are created either automatically by NetWare or explicitly by administrators for referencing replicas located on other servers. All of these replicas are transparent to the users, but most take a lot of work on the administrator side to design and implement correctly. While they provide a measure of fault tolerance, figuring out which type goes where is a daunting task.

Administrators should be

careful when designing the NDS tree, the structure where groups or organization units are placed. A directory service should reflect the organizational structure of a company, with units for the accounting, sales and marketing departments, for example. A common mistake is to create one NDS organizational unit for every server; that defeats the whole purpose of using a directory service to model an organization's real structure.

We found the whole process of setting up the NDS database to be rather cumbersome compared to our experience with Banyan's StreetTalk. VINES is easier in that it has only three levels, but this also limits an administrator's ability to model the organization's structure. The added complexity of NDS is the price you pay for more flexibility.

Once it is set up and running, NDS is, for the most part, flexible and easy to use. Merging tree structures, however, is an exception, despite the nearly 20 pages of instructions in the manual.

NDS is extremely extensible. Everything under NDS — including users, organizational units and organizational roles — is considered an object, and each object has various attributes. We found that adding extra information to user IDs was easy. However, the best location for placing application-specific information into the NDS database may not be readily apparent, as administrators have the option of putting information in many different objects.

Administrative objects can have attributes and information that can apply to many other objects, such as groups or templates. Administrators just drag an object (for example, a user) to the appropriate container (in the case of a user, that might be a group) to give the object the attributes of the container.

They can also create roles and assign them to specific users. A role of printer manager, for example, conveys certain rights to manage a printer or set of printers. Reassign the role and another user has this ability; administrators don't have to keep reassigning rights to individual users.

We didn't find a great number of applications that integrate

NDS with messaging and other third-party services. Some notable exceptions are CallWare from CallWare Technologies, Inc. (voice processing), Novell's own GroupWise (messaging) and DS Expert from NetPro Computing (third-party management tools).

Figure 1:

NWADMIN shows multiple levels of the NDS tree in a single window.

By clicking on an object in the tree (in this case, a group), administrators can change its properties.

For getting as late a start as it did in directory services, Novell has created a credible and efficient product. Documentation is easy to read and understand, but an administrator without prior exposure to directory services should consider taking the NetWare 4.X Administration class to get a head start on managing NDS.

Messaging: GroupWise and MHS

While NDS unifies objects across the network, Novell's messaging strategy is bifurcated. The company offers Message Handling Services (MHS), with its shared file/shared directory message store, and GroupWise, with its intelligent message transfer agent and server-based rules.

Novell's messaging migration strategy calls for the company to combine the current Novell messaging products into one, with a client/server-based object store. GroupWise XTD is slated to arrive early next year (see story).

Today, NetWare 4.1 ships with a built-in messaging transport called MHS Services 1.0 for NetWare. This is a somewhat different product than previous versions MHS 1.5 and NetWare Global Messaging, also known as Global MHS (GMHS). MHS Services is NDS-aware, meaning that all users, distribution lists and organizational roles are objects in the NDS database. MHS 1.5 and GMHS, on the other hand,

are NetWare 3.X products and are not aware of directory services.

When we conducted our tests, there was no released product for interconnecting GMHS with MHS Services. By the time you read this, Novell is expected to have shipped a Global Access Module that enables GMHS and MHS on NetWare 3.X servers to work with MHS Services on NetWare 4.1, using a single directory.

MHS Services creates a messaging server object (usually servername_MSG.NDSTreeName) and adds the server to an MHS Routing Group. Servers in the same routing group exchange messages and directory information. Two NetWare Loadable Modules (NLM) run on each messaging server, requiring about 500K bytes of additional server memory. No other setup is necessary other than creating mailboxes and granting access to users.

Adding a user to MHS Services is a matter of choosing an object (such as a user, distribution list or organizational role) in NWADMIN, selecting the mailbox tab and choosing a messaging server. This creates a mailbox for the object on that messaging server, after which the user can use any MHS-compatible mail client and begin sending messages.

Novell ships a DOS and Windows E-mail client with NetWare 4.1. The products, FirstMail and FirstMail for Windows, cannot compete with GroupWise feature for feature, but they're functional and easy to use (see Figure 2, page 65).

Other MHS clients, including Banyan's BeyondMail and On Technology Corp.'s DaVinci E-mail, are widely available.

When users log on to NDS and launch an MHS client, they are automatically connected to their mailbox on the appropriate messaging server, thanks to the integration of NDS with MHS Services. Messaging services such as a global directory (which shows name, department, phone number, E-mail address and other relevant infor-

mation) are automatically available to a user. If a user moves to a new physical location, the administrator can use NWADMIN to change the location of his mailbox to a messaging server in closer proximity. Any messages that were in transit are automatically rerouted to the new location.

GroupWise integration

Customers looking to integrate messaging, task management, scheduling and workflow capabilities should skip MHS and look directly to Novell's other messaging platform, GroupWise, which has all those functions built-in. When combined with optional software such as the SoftSolutions document management product, InForms workflow and database access, and Collabra Software, Inc.'s Collabra Share workgroup software, GroupWise is a formidable group collaboration platform.

GroupWise's messaging system integrates with directory services either via an add-on module for NWADMIN called the NetWare Integration Module, or with a synchronization NLM called NGWSYNC. The integration module allows an administrator to assign and manage GroupWise mailboxes for NDS objects such as users, resources (such as conference rooms or overhead projectors) and distribution lists.

Among other things, installation of the Integration Pack modifies the NDS schema by adding new fields. After installation, there are two additional object types listed in the NWADMIN's Create Objects menu:

GroupWise Distribution Lists and GroupWise Resources. From the NWADMIN Tools menu, there is also a menu item for GroupWise Options that allows administrators to delete GroupWise accounts (or remove the NDS association for an object), check GroupWise files (GroupWise database administration and maintenance) and set preferences for using the new tools.

When administrators create an NDS user object and define additional properties for it, they can assign a GroupWise post office and username (which, by default, is the user's NetWare logon name). All of the relevant information stored on the identification page for that user (such as the user's department, location, phone number, title and custom fields) is passed along to the GroupWise directory.

An alternative method of integrating GroupWise and NDS is the NGWSYNC NLM, which replicates changes made in the NDS database to GroupWise. However, NGWSYNC assigns all new users in an NDS container to the same GroupWise post office, and you can associate each NDS container with only one post office.

Only one of the integration methods should be used at a time. Which you choose depends on how much flexibility you need in defining new users. With the integration module, you have a great deal more flexibility in selecting post office locations for users and other objects. If you can get by with having all users in an NDS container belong to a single post office (with default settings), the

Novell's messaging direction

Today, you must load the GroupWise MHS NLM in order to transfer messages and synchronize directories between GroupWise and Global MHS. Novell plans to end the differences between MHS and GroupWise transports by combining them into a single message transport, eliminating the need for the separate transports now in GroupWise and MHS. The new GroupWise XTD architecture will also mark the transition from the shared file post offices now used with MHS and GroupWise, to a client/server-based virtual object store.

In addition, XTD will combine the existing client functionality of GroupWise 4.1 with the group collaboration features of Collabra Share for GroupWise, the document management features of SoftSolutions, and the database and workflow features of InForms. With XTD, any type of client will be able to access messaging services directly from the GroupWise transport — MHS, Messaging Application Programming Interface (MAPI) 1.0, Common Messaging Calls 2.0 and GroupWise clients. This contrasts with the current Simple MAPI implementation, which allows the GroupWise client (not the transport) to respond to mail-enabled applications.

Any gateway that supports MHS or GroupWise will continue to work with XTD — including directory synchronization features.

NGWSYNC.NLM suits this purpose.

Wising up to management

While NDS and MHS are homegrown services, Novell relies on a partnership to provide full-featured network management.

Novell and Intel Corp. created ManageWise 1.0 by integrating five products that give a

Figure 2: Novell's FirstMail for Windows client *comes with NetWare, but it provides only basic E-mail functionality.*

network administrator the ability to monitor the health and well-being of the network and troubleshoot problems, including ones that crop up on workstations, all from a single desktop management console.

The two mainstays of ManageWise are Novell's NetWare Management Services 2.0 (NMS) and Intel's LANDesk Manager 1.51. To round out ManageWise, Novell also contributed NetWare Management Agent 1.6 (NMA) and NetWare LANalyzer Agent 1.0, while Intel kicked in LANDesk Virus Protect 2.1 (see Figure 3).

While ManageWise is a powerful tool for managing small to midsize NetWare networks using NetWare 3.1X, it starts to lose some of its shine when it is deployed in large NetWare 4.X network environments. It doesn't lose any of its ability to effectively manage the network infrastructure or troubleshoot user-related problems; but it does not give the network administrator the ability to manage NDS objects — ignoring, in effect, the NDS tree.

ManageWise is still a server-centric product in philosophy. It can only effectively manage NetWare servers that have the ManageWise Server Agents installed. In our opinion, future versions should take a network-centric approach, with server management capabilities that apply to the network as a whole and that are integrated with the NDS tree.

On the plus side, the information ManageWise gathers is not limited to NetWare devices. Any Simple Network Management Protocol-enabled device or service can be monitored and managed through SNMP Management Information Bases (MIB). ManageWise even allows information generated by third-party programs such as Compaq Insight Manager (for managing Compaq Computer Corp. servers) to be accessed from the console.

Console prize

ManageWise can be viewed as three components that perform distinct roles: the console, the server agents (or services) and the desktop tools for accessing and troubleshooting clients.

The ManageWise console consists of the NMS database and a Windows application. The console provides access to all the ManageWise functions and information. This includes launching the desktop tools for solving user-related problems, accessing any information stored in the NMS database and communicating with the server agents for real-time or long-term data.

The NMS database keeps track of the logical network topology along with information about physical locations, configuration of network nodes or segments, alarm criteria and NMS configuration. Any other data that is accessible through the ManageWise Console is stored with the server agent that collects it.

If the network is too large for one administrator, more than one console can be used. However, there are no provisions for replicating the NMS database that each console must access — another indicator of a workgroup-orientation.

A suggested workaround entails a network administrator

designating a "master" console as the only point of entry for new information. The database can then be copied to a network drive for use by the other consoles. They can use the data, but they should not update it.

The abundance and diversity of real-time data reported by the server agents about network devices and performance is one of ManageWise's greatest strengths. The administrator has a great degree of latitude in configuring what events ManageWise watches out for, the level of severity assigned to the event and any subsequent actions performed automatically in response to a particular network event.

For instance, an administrator can have ManageWise watch for conditions that point to an impending failure, making it possible to take proactive steps to correct the situation instead of merely reacting after it's too late.

Another use for the data collected in the NMS database is building logical maps that help administrators find out what network nodes are active and what segments they belong to. This includes not only servers and internetworking devices such as routers and hubs, but also desktops. In addition, users can build physical maps detailing the network's layout for inventory and planning purposes.

Server Agents 101

The server agents are groups of related NLMs that run on the servers where ManageWise is installed, gathering specific types of information from the network and sending it to the console. They also respond to console-generated commands. Although there are more agents available to increase its functionality, ManageWise ships with these five:

■ **NetWare Management Agent** — NMA provides the console with real-time performance and configuration data such as available and used volume space, real-time CPU utilization, memory pool usage, NLMs loaded and installed hardware (such as network interface cards, hard drives and controllers).

■ **NetExplorer (and NetExplorer Plus)** — NetExplorer gathers information about the network by looking at the ManageWise server's bindery, Service Advertising Protocol and Router Information Protocol information. NetExplorer uses this data to query these devices using SNMP. This process discovers individual networks, network segments, nodes on the segments, node addresses, and advertised services such as serv-

ers and routers.

■ **NetWare LANalyzer** — NetWare LANalyzer monitors network traffic to identify all active devices, gathers information on statistics and trends, generates alarms, captures and decodes packets when requested, and gathers information from other NetWare LANalyzer agents. This information is used by both the console and NetExplorer.

NetWare LANalyzer can monitor all the segments physically attached to the server it is loaded on. Segments not attached directly require another NetWare LANalyzer agent in order to be monitored.

■ **LANDesk Virus Protect** — This service scans the ManageWise server volumes for known virus patterns by looking at files entering and leaving the server. It traps files that are opened for virus-like modifications. When a workstation logs on to the ManageWise server, the logon script loads several small TSRs that perform similar scans and traps for continuous and on-demand protection from viral activity.

■ **LANDesk Inventory Manager** — Inventory Manager collects hardware information (such as CPU type and amount of memory) and software information (such as versions) about the network nodes. When a user logs on

The abundance and diversity of real-time data reported by the server agents about network devices and performance is one of ManageWise's greatest strengths.

bleshoot the problem using the LANDesk Manager desktop tools.

Those tools can help an administrator gather information about individual desktops and solve user-related problems from the ManageWise console. The administrator can:
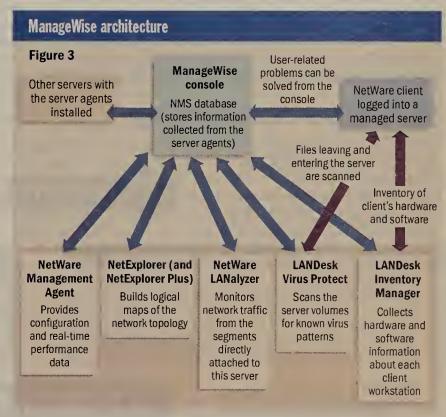
■ Take control of the workstation remotely from the console to make direct configuration modifications or demonstrate actions.

■ Communicate directly with a workstation's user utilizing a split screen dialogue window to ask questions or deliver information.

■ Copy files from the workstation to the console for modification, and deliver them back to the workstation for use.

■ Access hardware and software information (collected by the server portion of LANDesk Inventory Manager) about a particular network node to determine probable cause of the problem.

■ Manage network print queues when users have trouble printing to a network printer without having to open a DOS window to use the PCONSOLE utility.

Deploying ManageWise

A ManageWise console requires a workstation with at least 512K bytes of DOS memory avail-

ManageWise architecture

Figure 3

Other servers with the server agents installed

ManageWise console

NMS database (stores information collected from the server agents)

User-related problems can be solved from the console

NetWare client logged into a managed server

Files leaving and entering the server are scanned

Inventory of client's hardware and software

NetWare Management Agent	NetExplorer (and NetExplorer Plus)	NetWare LANalyzer	LANDesk Virus Protect	LANDesk Inventory Manager
Provides configuration and real-time performance data	Builds logical maps of the network topology	Monitors network traffic from the segments directly attached to this server	Scans the server volumes for known virus patterns	Collects hardware and software information about each client workstation

to the ManageWise server, two TSRs are loaded in upper memory on the user's desktop. They allow Inventory Manager to collect and update information about the workstation, ensuring that the administrator has the current settings available to trou-

able, 16M bytes of RAM, at least a VGA monitor (SVGA preferred) and plenty of disk space. The disk space is not only for the console software, but also for the NMS database.

Novell highly recommends

that the console software and database be stored locally instead of on a network server. If not, when that server is down, the ManageWise console can be of no help since the NMS database is inaccessible.

Enter the enterprise

NetWare 4.1 is a solid step into the enterprise realm for Novell. It brings together the market-leading file and print two services with a true enterprise-ready, fault-tolerant directory in NDS. Using both, customers can consider the network a single unit instead of a collection of servers and configure their networks, and their directories, as they see fit.
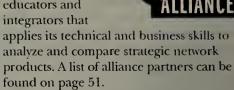
Likewise, Novell has a compelling story to tell with the marriage of NDS and GroupWise, giving users integrated messaging, workflow and group collaboration tools.

And all of the above is now divorced from reliance on any one particular server for both the user and the administrator — a key sign of an enterprise product.

Work remains to be done on the management front, where Novell is still somewhat stuck in workgroup mode. But even there, the lineup of products under the ManageWise umbrella represents a giant step forward.

Next week, we'll take a look at Banyan's latest effort, VINES 6.0, and see how well it answers the enterprise challenge.

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The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 51.

In-box

decent bundled Internet connections.

Windows 95 is a good product, but in my opinion OS/2 Warp Connect is better.
Nilay Patel
Chief business consultant
Creative Computer Services
Danville, Calif.

Authors' response: We put our credibility on the line every time we write or speak in public. We have installed OS/2 before, starting with Version 1.1.

We compared OS/2 Warp Connect to Windows 95 because network managers will need to choose between these two platforms when looking for their mainstream client.

As far as DOS memory is concerned, we simply installed the operating systems and ran MEM in a DOS box to tell us what was there.

If the default installations differ so significantly from tweaked installations, that is an indication that the standard setup program is inadequate.

We got our price from IBM's public relations department. Prices quoted are always list prices, not street prices, which vary.

We ran a network I/O performance test. We also subjectively ran Windows applications (Winword and Visio) and simply noticed that the user interface for OS/2 seemed sluggish. The argument that OS/2 applications run faster under OS/2 is specious.

OS/2 Warp is a more stable platform than Windows 3.X, but millions of users run Windows 3.X with less than two reboots a day. Since Warp uses Windows to run Windows applications, its stability is compromised if users run multiple Windows applications in a single Windows session.

Windows 95 is also more stable than Windows 3.X. Even with beta code, we had no crashes in the testing period and have had few over the months we've tested Windows 95.

It's imperative that a reviewer run the install program as if he or she was a novice. We find it hard to believe that anyone could install OS/2 in 15 minutes because simply copying the files from the CD took twice that long in our testing.

We also know that the 100th installation goes much faster than the first. But that isn't what we timed for either system.

Keep those cards and letters coming!

Management Strategies

Covering: Career Insights and Innovations
in Managing Staff, Budgets and Technology

Get a handle on hiring

Apply project mgmt. techniques to get qualified help fast.

By Frank Schoff

For many companies, the search for new networking talent is on for the first time in five years, if not longer. While this promises to bring an end to 60-hour work weeks for current staff, some net managers aren't smiling yet.

The recruiting practices used by many managers don't keep pace with the volume of newly approved positions. Others are taking on hiring tasks for the first time or finding themselves too busy to recruit because they are filling the void created when someone on staff has been hired away.

Managers with little or no formal training in recruiting can apply to the process a skill they practice nearly every day — project management.

This gives managers control of an unfamiliar process by enabling them to view it on their own terms.

Project management techniques can work as well on the recruiting process as on a major net implementation, largely because recruiting is periodic in nature. It can be assigned start and completion dates, and tasks or events can be defined in advance.

There are some definite parallels between capital investment projects and recruiting. Upper management authorizes the purchase of new equipment with the anticipation of a return on investment. Typically, a capital outlay consists of equipment, implementation and operating costs.

Likewise, the authorization to hire a new employee is given in anticipation of getting a return on investment. Typically, investment in new personnel comes in the form of recruiting costs, relocation expenses and outlays for salary and benefits.

Assembling the project team

A key element in managing any project is to identify the project team members and define their roles.

The recruiting process should involve the following:

n The hiring manager should activate and manage the project according to plan. This person also should be responsible for creating job specifications, developing and controlling the budget, interviewing and having a strong voice, if not the final one, in the hiring decision.

n Human resources staff should be responsible for internal and external communication, including posting or advertising the position, coordinating with external recruiting resources, scheduling interviews, conducting initial screening interviews, testing, checking references and coordinating the hiring processes.

n External recruiters also can be responsible for finding and screening candidates, coordinating interviews, checking references, and offering general consultation concerning position specifications and compensation.

n The project manager's boss may be a late-stage interviewer, a critical vote holder, the ultimate decision maker or budget controller.

The boss also should function as an adviser to the project manager and assess the growth potential of final candidates. Lastly, the boss should evaluate the project manager's performance as with any other project, making sure the project finishes on time, within budget and is a success.

Others that may take part in the interview process include the successful job candidate's future peers, managers of other departments that will interact with the candidate and potential subordinates. You also may want to consider scheduling an external interview with a psychologist for people stepping into high visibility positions.

Each team member should be identified in advance and advised about their roles. And make sure they understand that the lack of their availability could slow the project to the point of eliminating interest on the part of highly qualified candidates.

Once funds have been authorized, it is incumbent upon the manager given control of that money to move as quickly as possible to invest it in the right product, service or person, and make sure the investment brings the anticipated return on schedule.

The right methods

Network managers can develop project management methodologies that help assure the right products and people are in the right places at the right times, and that the final desired objective is achieved within the originally committed timeframe. That responsibility holds true whether the goal is to acquire and implement new equipment or to search for and hire a new employee.

I have not met a manager who would allow funds granted for an equipment purchase to sit idle, but on more than one occasion I've seen new-hire requisitions for weeks or even months sit with little or no action.

Managers that keep job openings unfilled often argue that a personnel search has a lower priority than other tasks, and therefore, does not get addressed. However, in many of those cases, the search has no priority status at all because it has not been given an identity that allows it to compete for time with other projects. It has, by default, been given a priority of zero.

Applying project management methodologies to recruitment changes that. Recruitment projects will be reviewed and managed in addition to other projects and directed to their completion.

But assigning project status to a personnel search goes beyond simply establishing a priority. All of the steps that are part of any sound project management technique can be applied to a search, as well (see graphic).

In a job market with this much hiring activity, timeliness is critical for attracting and securing the best candidates. Slow hiring processes send the wrong messages to potential top-notch employees.

It could be construed as a lack of interest, a lack of urgency in getting staffed up, a lack of discipline to set aside the time required for the task and a lack of control.

Are those the messages you want to send to potential employees? Not if you want the best instead of what's left.

Schoff is president of Management Recruiters, Cedar Mountain, N.C., a search firm specializing in networking professionals. He can be reached at (704) 884-4118.

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CISCO SYSTEMS

New Frontier Technologies Internet Software Allows Offline Search

By ANN KRAUSS

Frontier Technologies, developer of award-winning TCP/IP applications, announced the release of a unique new Internet software product for Microsoft Windows-based systems, SuperHighway Access CyberSearch™. This CD-ROM product features Frontier's popular SuperHighway Access Internet browser, integrated with a huge database of Internet resources which can be searched off-line, thereby reducing on-line charges and increasing productivity. The database is Lycos™, developed by Carnegie Mellon University, which is widely accepted as the most extensive catalog of Internet resources.

Frontier Technologies' SuperHighway Access CyberSearch will be produced monthly (bi-monthly initially), to reflect the rapidly-expanding array of information available on the Internet. Subscribers will pay as little as $6.75 per month. Each CD will contain a newly compiled version of Lycos, covering over 500,000 Internet pages indexed by keyword. Users can browse off-line for sites of interest and assemble a file of Internet resources using SuperHighway Access's sophisticated Internet Organizer. Then, once connected to the Internet, users can launch multiple searches at once, and be reviewing or downloading information from one site while connecting to another.

"It is now widely understood that one of the primary barriers to user productivity on the Internet is finding information," said Dr. Prakash Ambegaonkar, president of Frontier Technologies. "That's why Internet search services like Lycos and Yahoo™ are among the Internet's most popular sites. As a result of their popularity, these services can be frustratingly congested and slow. By putting the Lycos catalog on a CD, users will be able to reliably and quickly locate the Internet resources they need before they even connect to the Net."

SuperHighway Access CyberSearch will work with the user's current Internet service provider, or new Internet users can establish an account via convenient autoregistration with PSINet's Instant InterRamp, a national Internet service provider. PSINet is offering CyberSearch users a free 7-day trial account, with the option to register permanently at the end of that time.

CyberSearch targeted at both business user and consumer

SuperHighway Access CyberSearch is suitable for both business and home use. It provides all the connectivity software required for home users to connect to the Internet via modem and will also run on an existing corporate TCP/IP local area network. By first pinpointing the sites they need to visit, using CyberSearch, employees can rapidly gather competitive information or market research.

Pricing and Availability

SuperHighway Access CyberSearch is available immediately. Frontier Technologies intends to market the product through retail channels and through subscription. The current product has a September 1995 cover date and is specially priced at $14.95. Frontier intends to provide bi-monthly issues initially and anticipates moving to monthly publication in January 1996. Two subscription choices are available: an open-ended "no-hassle" subscription at $6.95 plus $3 shipping and handling, billed per issue (credit card customers only), and a 6-issue charter subscription offer for $58.50 ($6.75 plus $3 s/h per issue). To subscribe with either plan, or to order an introductory trial issue, customers should call 1-800-879-0075. (Outside the U.S., please call +1-414-571-0190.) Further information is also available on Frontier Technologies World Wide Web site, www.frontiertech.com.

Frontier Technologies, founded in 1983, is a global company with headquarters near Milwaukee, Wisconsin. With offices in California, Pennsylvania, Europe, and India, Frontier Technologies now employs more than 100 people worldwide. ∎

SuperTCP Suite, CyberSearch, Internet Organizer and SuperHighway Access for Windows are trademarks of Frontier Technologies Corporation. Lycos is a trademark of Carnegie Mellon University.

Photo by Tim Davis

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Digital hopes to cash in on growth of Internet

By Jodi Cohen
Newport, R.I.
Making a big play for the Internet software market, Digital Equipment Corp. last week announced a series of new products to improve net access and increase security.

In an analyst briefing here, Digital Chief Executive Officer Robert Palmer offered a glimpse of the company's new focus on the connectivity software market but fell short in providing product details.

Among the hottest new Internet products, which will fall under the company's newly created Connectivity Software Business Unit, is a suite of Internet security products and mobile computing software.

In addition to Digital's existing firewall products, the company will roll out tunneling security products by year-end. Digital will offer a group tunnel, which allows two LANs to use the Internet instead of private bandwidth, with data encrypted between the two LANs.

The company is also readying a PC tunnel product that runs on Microsoft Corp.'s Windows 95. It will allow users to connect to the 'Net through any Internet service provider, go through the corporate firewall and then be decrypted on the LAN.

Other new products on the way from Digital include:
■ Web Forum software used to create dynamic teams that can collaborate across the Internet. Digital plans to ship the groupware product next month.
■ A mail server and directory server for the Internet, which are planned for early next year.

Many users said that Digital is a credible player, especially since the company shipped its first firewall product eight years ago. "People are very concerned about Internet security," according to Bill Gassman, a software consultant for Digital. "Companies are very scared about the lack of protection that exists, and one of the easiest solutions is a firewall."

But Robert Craig, systems analyst at Williams Pipe Line Co. in Tulsa, Okla., said that since his approach to Internet security involves only letting E-mail through the firewall, he does not see a great need for Digital's Internet security products. "We're doing really simple Internet security, but it is also very effective," he added.

But Craig expressed interest in Digital's mobile computing software. "We have a lot of mobile users in our company — about 10% of our workforce — so it would be very beneficial," he said. "Right now, their 'Net access is limited, and we need to expand that."

The company, however, has its work cut out for it in groupware. Digital has had groupware products — LinkWorks and TeamWorks — for some time but has never captured anywhere near the success of Lotus Development Corp.'s Notes.

The Internet-based strategy may make sense, since the Web has emerged as a groupware dark horse in light of the Internet becoming an inexpensive alternative to distributing information.

©Digital: (800) 344-4825.

Digital delivers a new line of stackable hubs

By Jodi Cohen
Maynard, Mass.
Digital Equipment Corp. last week rolled out a new family of stackable hubs under its enVISN network architecture that provide users with flexible network design and connectivity options, analysts said.

The announcement marks Digital's entrance into the stackable hub market, where it will compete against products from 3Com Corp., Bay Networks, Inc. and Hewlett-Packard Co.

The firm's new MultiStack System, which will be demonstrated at this month's NetWorld+Interop show in Atlanta, allows users to start out with a stackable hub module and add switching, routing, remote access, LAN monitoring and management hub modules as the network grows.

"MultiStack offers universal modularity," according to Greg Cline, program director of network integration and management at Business Research Group in Newton, Mass.

In addition to offering a range of connectivity modules for the stack, Digital offers users a variety of net design options. The MultiStack modules can be stacked up to 16 high, either in a single physical stack or distributed as many as 185 meters apart in a logical stack that is managed as a single unit. The modules also can be rack-mounted.

Users also can remove the hot-swappable modules from the MultiStack System and redeploy them in the DEChub 90 workgroup chassis or in the DEChub 900 MultiSwitch enterprise chassis. Likewise, all existing chassis modules can be used in the stackable configuration.

Skip MacAskill, senior research analyst at consultancy Gartner Group, Inc. in Burlington, Mass., said he likes the way Digital allows users to protect their investment.

"Digital allows you to start small with stackables and redeploy these modules into a bigger enclosure should that network grow up and continue to expand," MacAskill said. "No other vendor does this on such a large scale, and a product like [MultiStack System] will help underscore Digital's influence."

Because the modules are compatible and can be managed as a single domain, MultiStack System users will be able to set up virtual networks. And with the DEChub 900, users can switch between multiple stackable LAN segments and incorporate Digital's distributed routing software to build firewalls.

As part of the Digital MultiStack announcement, Digital rolled out the DECrepeater 90T-16, a 16-port manageable Ethernet stackable hub module. The company also announced new built-in Simple Network Management Protocol agents for the DECrepeater 90TS eight-port Ethernet hub and the DECrepeater 90FS two-port 10Base-FL hub, which allow the repeaters to be managed in a single SNMP domain.

The modules can be managed via Digital's HubWatch management application, which runs as a stand-alone or on top of net management platforms like HP's OpenView.

DECrepeater 90T-16 is priced at $795, DECrepeater 90TS costs $995, and DECrepeater 90FS is priced at $1,595. All products are available now.

©Digital: (508) 493-5111.

Stocking up on stackables

Product	Description	Price
DECrepeater 90T-16	16-port 10Base-T manageable stackable hub	$795
DECrepeater 90TS	8-port 10Base-T SNMP-managed stackable hub	$995
DECrepeater 90FS	2-port 10Base-FL SNMP-managed stackable hub	$1,595

All products are available this month.

Frame relay

lay cloud, while AT&T's platform simply stops data from entering the network when congestion develops.

An official close to the project characterized Sprint's approach as "a true pipelining scheme" that does not risk blocking frames at the network entry point if traffic backs up.

Increasing risk
AT&T officials have said that Sprint's approach actually heightens the risk of dropped frames because they are sent into the frame relay cloud heedless of traffic conditions and may not make it to the other side.

But Tie noted that Sprint is supplying service-level agreements (SLA) guaranteeing a certain level of throughput. Such SLAs are a standard feature of Sprint's new flagship Burst Express frame relay offering featuring a zero committed information rate (CIR) on permanent virtual circuits (PVC) (*NW,* June 12, page 8).

The travel agencies will be tied into the frame relay cloud via 56K bit/sec ports on the Sprint switches, with zero CIR on the PVCs. This is more than adequate for the simple text/data transfers characteristic of agency work today. But network officials are hoping to take advantage of the ability to burst up to the full 56K bit/sec port speed with new applications that could feature graphics and even Internet access.

"It's transaction-oriented [now] but there will be some burstiness because they will add more applications," said Ed Bursk, FastComm's vice president of marketing.

The network topology is a modified star arrangement in which each travel agency either has a single PVC back to the data center or sends data frames into the frame relay cloud of a local regional Bell operating company.

In the latter case, Sprint and the RBOC establish a private Network-to-Network Interface — a dedicated circuit between their respective switches devoted to single user's network.

The loss of the System One WAN is a blow to AT&T, whose private lines and other circuit form the heart of the network over which EDS carries traffic for the bulk of its customers.

In fact, EDS enjoys one of the original AT&T Tariff 12 agreements for a custom telecommunications net at rock-bottom rates, but the Tariff 12 deal is due for renewal soon. And top EDS officials are said to be angry about AT&T's recent fullfledged move into the outsourcing business — likely competing with EDS for flagship customers — and threatening to yank more business from AT&T.

One industry analyst said individual EDS units are being freed to pursue their own network services contracts through competitive bids. An EDS spokeswoman would say only that the company overall gives at least some business to all the major carriers.

Senior Editor Joanie Wexler and Senior Writer Tim Greene contributed to this article.

LANshark

Unix and AppleTalk users access files on NT, products such as LANshark and Toucan make NT a common ground for file sharing in a mixed net, said Scott Sharkey, president and chief executive officer at LANshark.

The product opens the door for users who want to stick with higher level VINES network services but want to escape limits, such as VINES' inability to support file volumes greater than 2G bytes and narrow range of backup options, Sharkey said.

The products get around some of the annoying characteristics of VINES, such as the 2G-byte file limit, said Robert Brydia, a research assistant for the Pennsylvania Transportation Institute at the University of Pennsylvania. "[The] idea of using an NT as a common ground is reasonable, especially in smaller networks," Brydia said. "There may be value-added components you can get by using the ENS product, such as StreetTalk, but for a smaller site, that may not even be needed."

CD-Direct costs $1,995 per server, StreetDrive costs $2,795, and StreetPrint is $1,295.

©LANshark: (614) 751-1111; Toucan: (805) 781-6230.

Bay Networks

before it can match Cisco's remote access lineup product for product.

"It's a start," said Jeremy Duke, senior analyst at In-Stat. "They've been slow to implement their remote access strategy. They're a little bit late to market, but by acquiring Xylogics, they bring a product to market that much quicker."

Xylogics' Annex product line comprises remote access and communications servers that address remote client access, multiuser host access and LAN-to-LAN routing capabilities. Remote Annex 2000 and 4000 are dial-up routers targeted at departmental and enterprise nets, respectively. They support IP-, IPX- and AppleTalk-based LANs.

Xylogics also obtained ISDN bridging and routing gear through the recent acquisition of Scorpion Logic, Ltd. of Watford, England.

And Bay Networks and Xylogics are no strangers to one another.

Last year, Xylogics struck an agreement with SynOptics Communications, Inc. — the hub company that helped form Bay Networks when SynOptics merged with Wellfleet Communications, Inc. — to add an Annex communications server module to SynOptics' Lattis System 5000 hub.

Xylogics also has similar agreements with Bay Networks competitors Cabletron Systems, Inc. and Optical Data Systems. Sales of Annex products through Cabletron accounts for 10% of Xylogics' revenue, but analysts, contrary to Cabletron statements, expect that business to now dry up.

"We are going to proceed with business as usual with our relationship with Xylogics as it stood in our contract," a Cabletron spokesman said.

Xylogics will become an independent operating unit of Bay Networks. ◼

Bay Networks bites into remote access market

Xylogics ranks among the world's leading remote access server vendors based on ports shipped last year.

- Xyplex **19.4%**
- Xylogics **21.2%**
- Shiva **21.6%**
- Telebit **10.9%**
- Cisco **9.7%**
- Livingston **4.0%**
- DCA **2.8%**
- 3Com **2.7%**
- Others (Includes Microcom, U.S. Robotics, Motorola) **7.7%**

Total: 718,119 ports shipped

SOURCE: IN-STAT, SCOTTSDALE, ARIZ.

Visual Basic

Roskill, director of marketing for Microsoft's Visual Basic product group.

But the new Visual Basic has some shortcomings, according to one beta user. First, it does not allow developers to write multithreaded applications even for multithreaded operating systems.

Secondly, although Visual Basic 4.0 can incorporate OCXs, developers cannot use 4.0 to create OCXs. Only OLE-compliant C++ tools can do that. Finally, the product is limited in that finished applications must run on Microsoft operating systems.

Key changes

But developers are not complaining much about these deficiencies, given what Visual Basic 4.0 delivers. It is available in three editions, including the Enterprise Edition, which contains three key networking changes:

◼ Remote Automation Connection Manager, which creates a seamless messaging link across a network between a Visual Basic client screen and OLE Server objects, such as mortgage calculations or security services (see screen shot, page 6).

◼ Remote Data Control, an OCX that can be dragged into a Visual Basic application screen to create a high-speed link to either a Microsoft SQL Server or Oracle database.

◼ The inclusion of SourceSafe, a version control and a source code management system.

Beta users were most enthusiastic about the Remote Automation capability. Developers can write an OLE Server in Visual Basic 4.0, put it on a remote computer such as a high-performance Pentium system and then activate the server from within client Visual Basic 4.0 applications, said David Sarna, chairman of ObjectSoft Corp., an Englewood, N.J., software firm.

Under the covers, when the Visual Basic application makes a standard OLE Automation call, the operating system consults the local OLE System Registry to find the OLE object being called. So far, no change in past practice.

Noticeable differences

What is different in Visual Basic 4.0 is that the object can sit on another computer. In that case, the operating system utilizes Microsoft's version of the remote procedure call (RPC) found in the Open Software Foundation, Inc.'s Distributed Computing Environment specification.

The RPC runs over NET-BIOS, Named Pipes, TCP/IP and other network protocols. Beta users said they had to change nothing in their application code to make use of this remote capability.

For the Remote Data Control, Microsoft wrapped an OLE interface around the Open Database Connectivity (ODBC) API, and optimized the control to exploit the latest features in Microsoft SQL Server and Oracle. The new control creates a high performance link with minimal programming.

Visual Basic 4.0 Enterprise Edition will be available by Sept. 18 for $999; Visual Basic 3.0 users can upgrade for $499. The Professional Edition, which lacks the network features, is $499, with a $99 upgrade fee. A low-end version costs $99.

Microsoft: (800) 426-9400.

COMMENTS?

Exchange

and scheduler, Organizer, with Notes, he added.

Naturally enough, Exchange also offers superior integration with Windows NT, which will make some administration tasks easier for users of the Microsoft operating system, Marshak s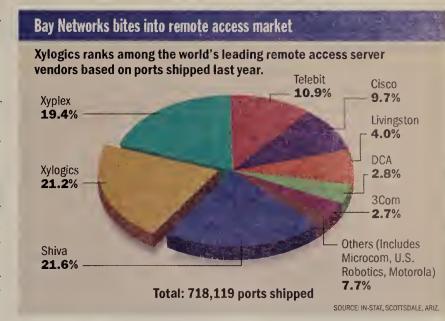aid. But that could also be Microsoft's biggest problem: The absence of cross-platform support makes Exchange a poor choice for companies looking to share applications across multiple platforms.

Passing grade

Marshak gave Exchange's development environment higher marks than that of Notes, too. That is because of Microsoft's use of Visual Basic, a favorite language among corporate developers. Lotus will offer LotusScript, which is Visual Basic-compatible and familiar to Visual Basic users, according to Ken Bisconti, Notes marketing manager at Lotus.

Exchange's final win over Notes is its packaging of an Exchange client with Windows 95. Marshak said that will be hard for Lotus to compete with, and one user called the client a "thing of beauty."

David Greenberg, president and chief executive officer of Visteon Corp., which is beta-testing Exchange, said, "With Notes, you must buy a seat. I can live with a little less functionality. [The Exchange client] is free."

Behind the eight ball

When Exchange and Notes ship, Exchange will be "far behind" in some areas, Marshak said. Notes' security model and replication abilities make it the clear choice for interenterprise applications and electronic commerce, he said. Exchange is designed more to share information inside a corporation, not beyond.

Exchange's workflow capabilities cannot compete with Notes', either. Lotus offers a better environment for building scheduled agents, Marshak said.

The early release of Exchange will also not offer great support for mobile users, a population that Marshak said Notes has always supported with local replication.

And the winners are...

Notes wins over Exchange in:
▶ Supporting mobile users
▶ Workflow
▶ Interenterprise applications
▶ Integrated applications development

Exchange is tops in:
▶ Calendaring and scheduling
▶ Integration with Windows NT
▶ Visual Basic support

Marshak's report was expected months ago but was put off until the second beta of Exchange shipped and Microsoft confirmed that the software was feature-complete.

Marshak said he and other analysts have had difficulty keeping up with Microsoft's repositioning and approach changes. For example, Microsoft has flip-flopped on whether Exchange is a competitor to Notes or simply its next-generation messaging platform.

One Notes 4 beta tester said his company did not even consider Exchange when it opted for Notes. "We can't afford to wait," said Mark Petry, a Notes system engineer with Intel Corp. "We also can't afford to debut a 1.0 product."

Even when Exchange ships, users will be in a holding pattern, he said. "As good a product as Exchange is, it still has a minimum of three years of catchup in terms of functionality and developer support."

Marshak's report, part of Patricia Seybold Group's Notes Strategist Series, is available for $95 by calling (800) 826-2424. Marshak can be reached at dmarshak@psgroup.com. ◼

Sybase

user is automatically disconnected when the query is received by a piece of software, called an agent, that resides on the server. That agent searches the databases for the requested information, which is encapsulated into a message and transmitted back to the user.

Burton said a strong transaction management feature would be required to ensure that transactions are completed.

"[Sybase] has a lot of work to do here, but ultimately, messaging technology means that users can access data where it resides," she said.

Messaging support is among a series of enhancements that Sybase plans for its line of gateways, according to Adrian. They will also gain support for the Open Software Foundation, Inc.'s Distributed Computing Environment naming and security services, as well as support for C++ and OLE clients, he said.

In a related development, Sybase will announce as early as next month plans for new replication agents for mainframe data sources, including IMS, VSAM and ADABAS, Adrian said. The firm now sells replication agents for DB2 and Lotus Development Corp. Notes.

The replication agents — scheduled to ship next year — will copy transactions from the mainframe data sources into Sybase databases, he added.

"This would be a nice thing for most companies, since many legacy applications use IMS or VSAM," said Norton Greenfeld, president of Implements, Inc., a Wayland, Mass.-based market research firm. Users have few choices for getting at data stored in these nonrelational file systems from their client/server applications, he added. ◼

Repository

said Sanders Partee, managing director of repository development at Platinum in Oakbrook Terrace, Ill.

It is that ambition that sets off the new Platinum product from most others. IBM and other vendors, for example, have application development repositories, while CASE vendors have storage

mechanisms for their models. A few stand-alone repository vendors — all small companies — have products that do some of what Platinum is trying to do.

Platinum, by contrast, is recasting the repository as a metadata clearinghouse that can cover all these areas as well as emerging functions, such as data warehousing, and brand-new areas, such as distributed systems management.

The product is for now called Platinum Repository/Open Enterprise Edition. The repository engine itself is a layer that will be able to run on top of different relational database management systems, which will physically store the data. Initially, the repository will be able to use database managers from Oracle Corp. or Sybase, Inc., followed by IBM DB2/6000, then other members of the DB2 family. Server platforms will be Windows NT, OS/2, HP-UX, Solaris and AIX.

Initially, two pieces of client software will be available for Windows 95, Windows NT and OS/2. One client is for now called General Editor, which is essentially a repository management interface. The second is Data Shopper, a specialized graphical user interface application for business end users to analyze metadata that describes in simple terms data held in production databases.

Clients communicate with

the repository over TCP/IP, NETBIOS or Named Pipes, and, next year, over APPC. The engine uses the appropriate database vendors' communications link, such as Sybase Open Client or Oracle SQLnet.

Platinum software engineers are modifying the company's

Platinum's new enterprise repository

The repository will store metadata, which is information about corporate data in existing applications and databases. This information can then be used by a wide range of tools for data warehousing, application development, enterprise data management and rebuilding legacy applications.

Where metadata comes from
- Third-party CASE models
- Legacy application data definitions
- Mainframe and Unix database structures
- Prepackaged applications' data models

Enterprise metadata
Platinum Repository/Open Enterprise Edition (on DB2/6000, Oracle, Sybase)

Platinum Repository (on MVS, DB2)

What the metadata can be used for
- Data warehouse administration and access
- Distributed data management
- Common CASE meta model
- Legacy reengineering
- Future support for client/server development tools

GRAPHIC BY TERRI MITCHELL

extensive product line, including its database and systems management tools, as well as data access and reporting products, to integrate tightly with the repository.

In a few months, Platinum will announce agreements with vendors of databases, CASE tools, application development tools

and data warehousing products, all of which will make use of the Platinum API to funnel their metadata into a managed, integrated environment.

That picture is an attractive one for MIS groups. Cheryl Langer, manager of data resource management at Ameri-

can Express Financial Advisors, Inc. in Minneapolis, said her company uses a repository as a clearinghouse for CASE models, which are used in application development, and to analyze the data definitions and structures of its databases and applications.

The main benefit of the repository, she says, is "if I do an

impact analysis [of a proposed change], I can see the impact on all parts of the system."

Jump-starting plans

Langer's project is based on the MVS repository product from Reltech Group. Platinum bought that company and its archrival, Brownstone Solutions, Inc., last spring to jump-start its own product plans. Both companies were within a few weeks of launching server-based versions of their mainframe products, according to Partee, a Reltech cofounder. Those plans went on hold during a fast-track review process.

In short order, the new repository division decided to adopt Reltech's underlying meta models, Brownstone's tools and merge the GUI development efforts.
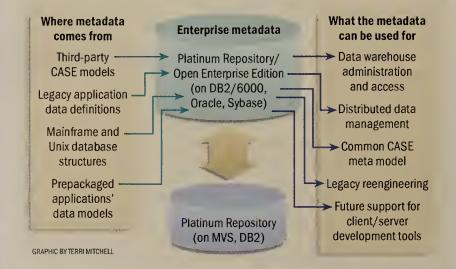
Platinum has brought to the repository concept its Platinum Open Enterprise Management System, a management framework that will now be integrated with the repository. Another Platinum priority is its embrace of object-oriented technology. The new repository is written in C++ and will gradually incorporate an expanding array of object-oriented features, according to Partee.

Partee declined to say when the repository product will be generally available.

Final pricing has not yet been decided. ∎

IBM

over a worldwide backbone of IBM Nways 2220 ATM switches.

While details of the unnamed offering remain sketchy, analysts expect the firm to deploy one service to help SNA users migrate to frame relay first, and then onto ATM. Other services such as videoconferencing, multimedia application enabler, video storage and playback could also be offered, along with ATM net management capabilities, analysts said.

The ATM offering will include other services, such as networked applications like an ATM-compatible Lotus Notes suite of applications in early 1996, sources said.

Integrated voice and video applications are expected along with outsourcing and consulting services, analysts added.

Sources said the ATM service will support a variety of different line speed links, from 56K bit/sec right up to T-3.

The new ATM service could be ready by October across the U.S., Canada, Latin America and Europe, sources said.

IBM officials acknowledged plans for an ATM service package but declined to discuss details.

Analysts said the new service will be unique in the infant public ATM market because it will support the Nways blend of cell- and packet-switching technology. This will let IBM's switches support variable data length packets and switched Asynchronous Transfer Mode-based cells simultaneously. These features will let users move SNA, LAN, voice and video traffic over the Global Network backbone.

The Global Network, which includes Advantis here, is IBM's value-added network (VAN) that includes hundreds of sites across the world. Advantis offers routing and other services on its existing backbone net.

The service is an outgrowth of the high-speed ATM backbone Advantis has been slowly rolling out in more than 80 sites in the U.S. (*NW*, Aug. 29, 1994, page 6). The company has not yet talked about forming the high-speed

backbone into a separate service offering.

Analysts had mixed reactions to the plans.

"This is IBM's platinum service for advanced functionality," said Howard Anderson, managing director of The Yankee Group consultancy in Boston. "It's not going to bring IBM tons of revenue, but it will demonstrate to everyone that IBM has its ATM products up and running."

"The ability IBM has to support low-speed links and many different data types via its switches could make this service highly attractive to potential users," added Steve Taylor, president of the Distributed Networking Associates consultancy in Greensboro, N.C.

The service could, however, be a double-edged sword for IBM. On the one hand, it shows the world that IBM's ATM products are for real, but it also sets IBM up as a competitor to carrier-based ATM services such as those from AT&T Network Systems and Alcatel Data Networks. Paradoxically, one of IBM's top

"The telco arena is a fraternity party that IBM hasn't been invited to attend."

desires is to sell ATM switches to carriers for future nets.

"This is a beguiling move by IBM given that it wants to get high-end Nways 2220 switches into carrier nets," said Anura Guruge, an independent analyst based in New Ipswich, N.H. "Carriers won't look too kindly at IBM if they perceive IBM to be a competitor."

Anderson disagreed, saying the IBM service may help it win carrier accounts down the line by proving the equipment can work in a public arena.

"Carriers look at IBM and see a data processing firm, not a telecom vendor," Anderson said. "The telco arena is a fraternity party that IBM hasn't been invited to attend."

Others question IBM's ability to deliver such a robust ATM service. "IBM has to deliver this service, not just promise it will," said Beth Gage, a consultant with the TeleChoice, Inc. consultancy in Tulsa, Okla.

Gage said if the new service has an advantage over other VANs or carriers in that it has global presence.

"No one is offering a global ATM service yet," she said. ∎

Back to Reality

Critics' arrows for Novell are now headed in another direction

A sking a network vendor how he feels about critics is like asking a lamppost how it feels about dogs.

"Critics," as the adage goes, "are the stupid who discuss the wise."

But that's not always the case. Novell, Inc. is a good example of a successful company besieged by critics. Unlike the adage, though, Novell's critics have not always been stupid nor the company wise.

My experience with Novell goes back to the mid-1980s, when the struggling

David J. Buerger

hardware company started to hawk packaged network software. At the time, I was a member of the IS staff at Santa Clara University. We needed to network the public relations department to support (big surprise) file and print services.

Novell's Advanced NetWare was in the right place at the right time. The other major alternative was 3Com Corp.'s 3+Share, which seemed kludgier and more complicated.

The reseller pushing NetWare barely understood how to configure the product. Then again, neither did most buyers. Everyone was confused, blundering our way to shaky solutions — some by design, some by accident.

In some ways, NetWare was the lesser of the two evils. I distinctly recall the decision to buy NetWare as a bet, hoping that we'd avoid as much grief as possible.

NetWare soon dominated the booming LAN market due to the lack of a better alternative. NetWare's market share made us feel vindicated, but it was still hard to use. Novell pushed NetWare as the fastest software available. The only serious challenger was 3Com's new 3+Open, a derivative of Microsoft Corp.'s ill-fated LAN Manager.

By this time, I had joined *InfoWorld* as director of the newspaper's test center. In early 1989, we decided to pit NetWare and 3+Open head-to-head. After months of effort, the lead editor walked into my office, shaking his head in disbelief. "3+Open won — it's faster than NetWare!"

We were not the only surprised observers. The results also shook Novell because the company had defined success as speed. If NetWare was not first in speed, it was no longer good.

That test and its subsequent publication led to a new level of awareness about network performance. It also helped the industry to push beyond the simple issue of speed, paying attention to how components affected overall network and application performance.

Novell's image among industry watchers, however, started to sag. Departmental

LAN sales were great, but the company was stymied in its efforts to become a serious player in the enterprise network market. New products were announced, were late and then failed to work without major revisions. Acquisitions failed to ease general understanding of where Novell was going. By the early '90s, Novell seemed to be adrift.

Later, as editor in chief of *LAN Times* and then *Communications-Week*, I presided over numerous articles that criticized Novell's lack of direction. So when *Network World* asked me to write this week's feature about Novell's Pervasive Computing vision (see story, page 54), I expected more of the same.

New viewpoint

My due diligence resulted in the opposite conclusion. The biggest factor that influenced this new perception was neither technology nor future product plans per se; it was the new people who run Novell.

Gone was the distraction with tactics. Every senior manager I interviewed projected a mature grasp of Novell's business and new opportunities. Planning and communication were top of mind, the opposite of past patterns. Also new was an excitement among employees about the future. They, too, have caught the vision.

Networking used to be a hard sell. Now information technology is essential to compete in the world market. And networking is the key to quickly getting the

right information to the right people. Good timing will again play into Novell's hands.

Sensing opportunity, Novell is finally behaving like a leader. The company has mapped out a logical vision. Most vendors just make widgets and hope for the best. That was the trap that had ensnared Novell.

Now the company is pushing outward, linking its core competency of networking to products that will touch millions of consumers who don't use computers. One example is NetWare Embedded Systems Technology, which will leverage important new partnerships — a key to growth.

My change of heart does not mean all is well with Novell. The company faces serious challenges from Microsoft, IBM and others. But CEO Robert Frankenberg has laid a solid foundation for a bright future.

An American psychiatrist once said, "The stupid neither forgive nor forget; the naive forgive and forget; the wise forgive but do not forget."

Novell's new team has earned this critic's forgiveness for past foibles. Now it must deliver on the promise of Pervasive Computing. Results are the only antidote to dim the pain of lingering bad memories.

Buerger is an Atlanta-based writer and industry consultant. He can be reached at dbuerger@pipeline.com.

CyberSpeak

What do you hope to get out of the upcoming NetWorld+Interop show?

■ "I hope to learn more about networking technology and the latest stuff, [including] what's happening with IATF, TCP/IP and ATM."
Douglas Comer, professor of computer science, Purdue University, West Lafayette, Ind.

■ "At NetWorld+Interop, you will see more technical presentations and talk to more technical booth representatives than at any other show. If you have specific questions about specific products, the cooperation among vendors [willing to find answers] is higher than at any other show, especially if you can get to the engineers."
James Gaskin, president, Gaskin Computer Services, Mesquite, Texas

■ "I would be looking for the opportunity to learn about breaking technologies, rumors of any changes, meetings with vendors who could give me insight into how I can support my WAN better and meet technicians for sources of information when I do need it in the future. As a contractor, I also look for points of contact for future revenue for my company."
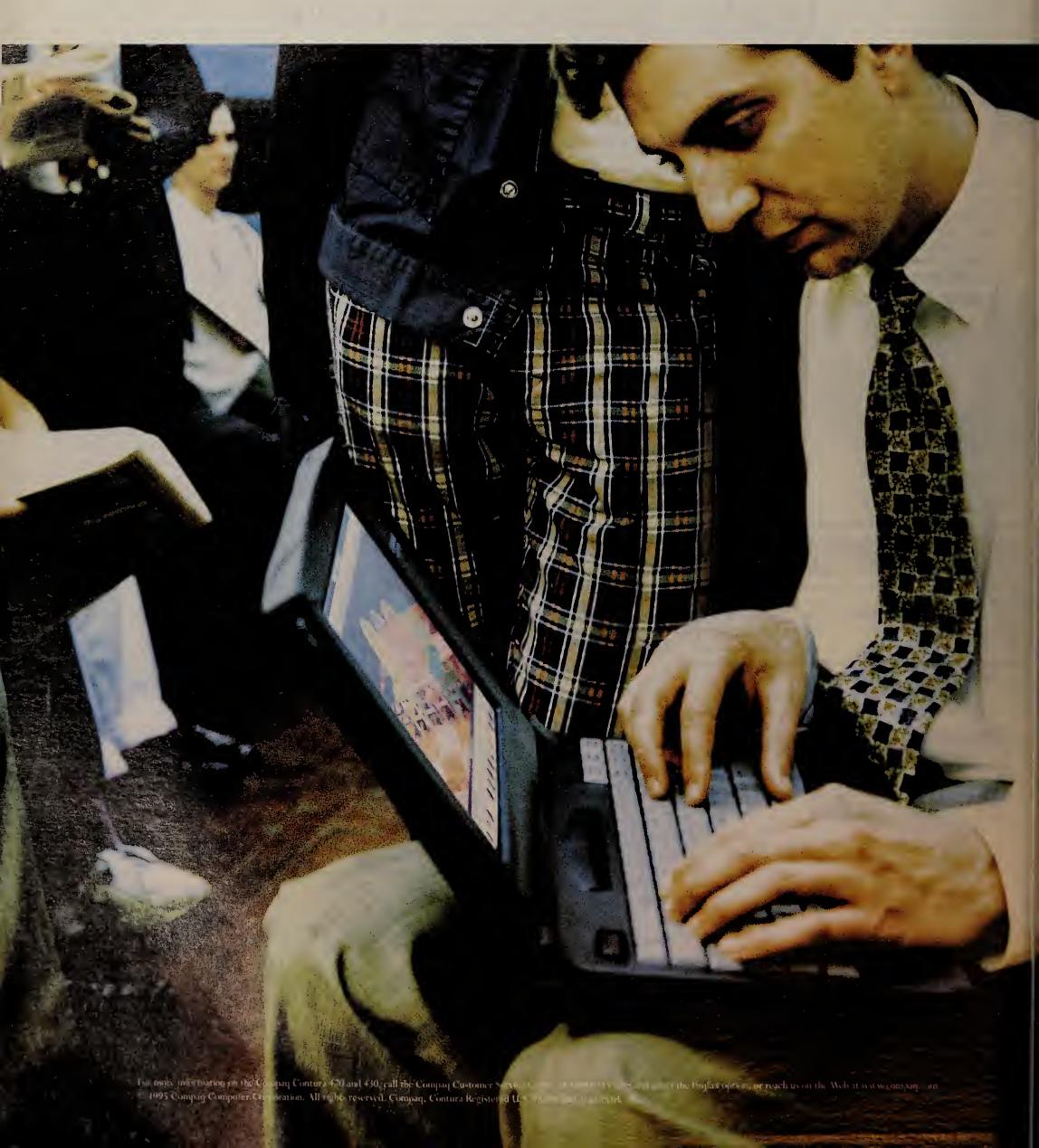**Eddie Albert, project manager, Inet, Inc., Washington, D.C.**

NEXT WEEK: Don't miss "Abend," our back-page column that alternates with "CyberSpeak" and brings you humorous items, oddities, marginalia and other insights from the Internet and elsewhere. Send items to network@world.std.com or get in touch with us any other way listed on page 51.

The new Compaq Contura notebooks. Powerful DX4 processors as fast as 100MHz. Up to 720MB of storage capacity. A docking base that lets you use an external monitor, mouse and keyboard. All in one remarkably affordable, elegantly efficient little package. Finally, a line of notebooks that excel in the oddest of places. Like wherever you happen to be.
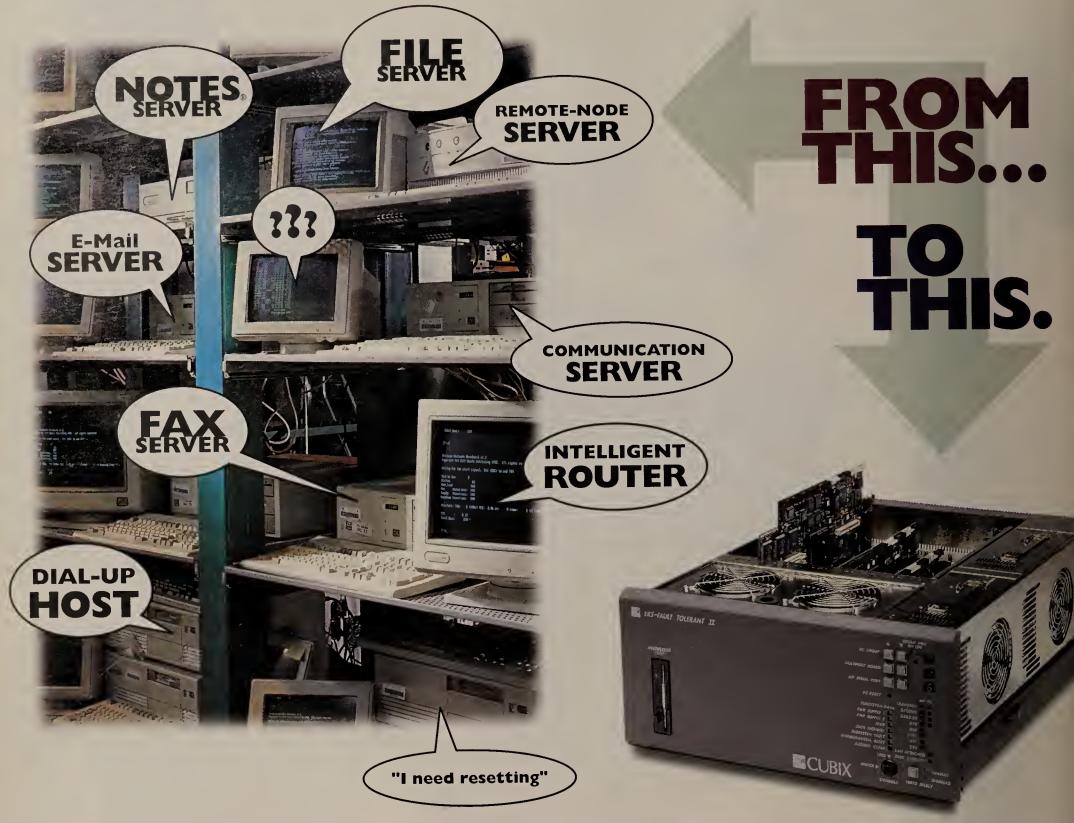
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